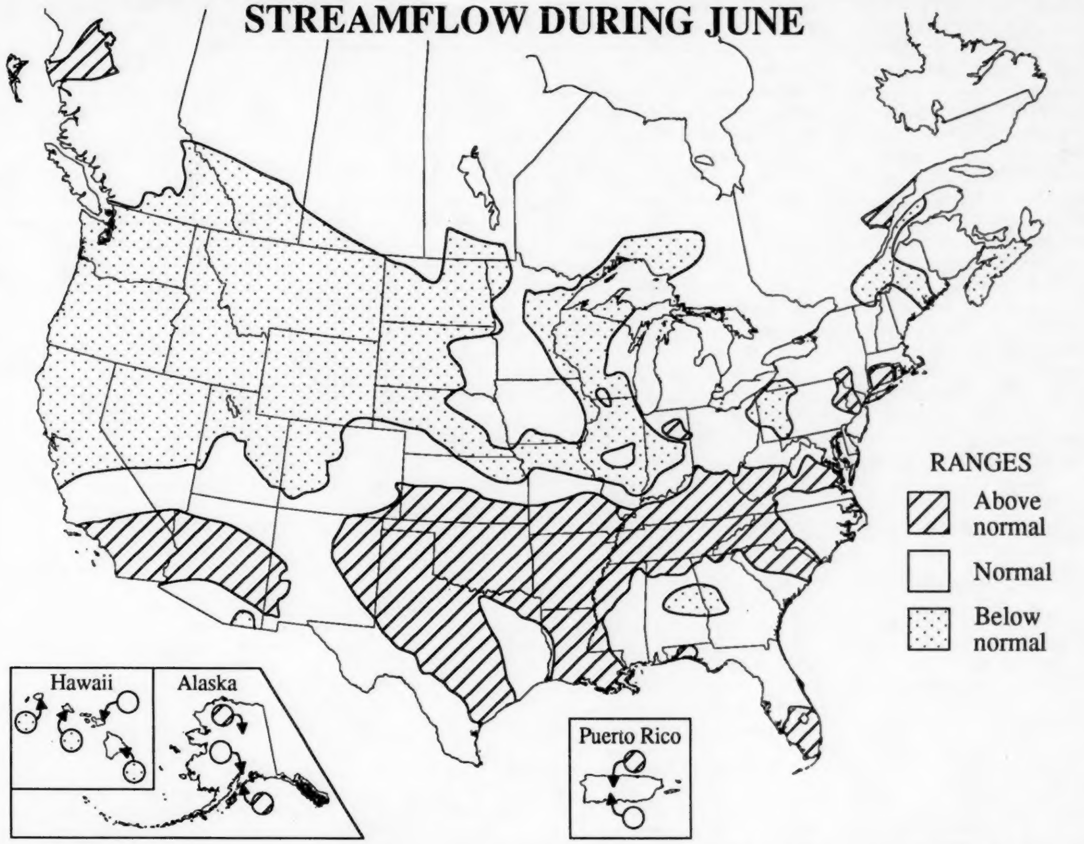
National Water Conditions

UNITED STATES
Department of the Interior
Geological Survey

CANADA
Department of the Environment
Water Resources Branch

JUNE 1992

STREAMFLOW DURING JUNE



Drought continues to affect California and has become severe in the Pacific Northwest, but flooding occurred in parts of Connecticut, Virginia, Kentucky, Florida, South Dakota, and Wyoming.

Streamflow decreased from that for May at 100 index stations, remained the same at 6 index stations, and increased at 76 index stations, resulting in normal to above-normal range streamflow at 62 percent of the 192 reporting index stations in the United States, southern Canada, and Puerto Rico during the month, compared with 49 percent of stations in those ranges during May, and 74 percent of stations in those ranges during June 1991.

Below-normal range streamflow occurred in 36 percent of the area of the conterminous United States and southern Canada during June, compared with 49 percent during May, and 15 percent (revised) during June 1991. Total flow of 821,500 cubic feet per second (ft3/s) during June for the 174 reporting index stations in the conterminous United States and southern Canada was 20 percent below median, 13 percent less than last month, and 21 percent less than flow during June 1991.

New June extremes occurred at 9 index stations—7 new minimums (at stations in California, Washington, Idaho, and Oregon) and 2 new maximums (at stations in New Mexico and Arizona)—compared with 11 new minimums and 2 new maximums during May.

The combined flow of the 3 largest rivers in the lower 48 States—Mississippi, St. Lawrence, and Columbia—averaged 1,017,000 ft3/s, 25 percent below median and in the below-normal range, after an 11 percent decrease in flow from May to June. Flow of the St. Lawrence River was in the normal range for the 13th consecutive month. Flow of the Mississippi River was in the normal range after two months in the below-normal range. Flow of the Columbia River was in the below-normal range for the second consecutive month, after three consecutive months in the normal range.

Month-end index reservoir contents were in the below-average range at 34 of 100 reporting sites, compared with 31 of 100 at the end of May, and 35 of 100 at the end of June 1991, including most reservoirs in Nova Scotia, Nebraska, the Dakotas, Montana, Wyoming, Colorado, Utah, Idaho, Nevada, California and the Colorado River Storage Project.

Mean June elevations at four master gages on the Great Lakes (provisional National Ocean Service data) were in the normal range and also below median except on Lake Ontario. Levels rose from those for May on Lake Superior, remained the same as those for May on Lake Huron and Lake Erie, and rose on Lake Ontario.

Utah's Great Salt Lake fell 0.40 foot, ending the month at 4,201.30 feet above National Geodetic Vertical Datum. Lake level was 1.40 feet lower than at the end of May 1991, and 10.55 feet lower than the maximum of record which occurred in June 1986 and March-April 1987.

SURFACE-WATER CONDITIONS DURING JUNE 1992

Graphs showing drought conditions for the Pacific Northwest and California are on pages 6-9, and more information on the California drought situation is given on page 30. The Governor of **Montana** requested drought-disaster-relief designation from the U.S. Department of Agriculture for 12 counties as of June 23. State fire danger ranges from high to extremely high. The June 14-18 rains provided some relief in central, south-central, and eastern Montana, but streamflow for the month ranged from 12 to 69 percent of normal. In **Wyoming**, June streamflow was generally much below normal. Rain in southern Wyoming and northern Colorado on or about June 8, however, contributed to some increased runoff. Heavy rain in the Mayoworth, Buffalo, and Sheridan areas June 14 and 15 caused some minor flooding and road damage.

On June 5-6, heavy rains associated with a small, intense low-pressure system fell on south-central and central **Connecticut**. As much as 7.76 inches fell in Cheshire and 10.0 inches in North Branford. One person was killed in Plainville and 39 businesses and homes were flooded in Southington. On June 5, a peak of record, about equal to the 100-year flood, occurred on Walker Creek at Bane (Giles County), **Virginia**, in the southwestern part of the State about 40 miles west of Roanoke. The peak was caused by apparently locally heavy rains as a strong frontal system moved across the State. On June 18, high winds and locally heavy rains occurred in central and northern **Kentucky**. Localized flooding occurred in Washington County as a result of heavy rains—up to 5 inches in a few hours in some areas. Fredericktown was especially hard hit by waters from Cartwright Creek. Damage in Washington County was estimated at $1.25 million to farm buildings, roads, and bridges, $1 million to machinery, and $1.1 million from land erosion. On June 24-25, a slow-moving tropical depression crossed over the west-central **Florida** counties of Manatee, Sarasota, and De Soto. Total rainfall from 5 p.m. on June 24 until 5 p.m. on June 28 totaled 24 inches in Venice, 16 inches in Bradenton, 12 inches in Myakka City, 8 inches in Arcadia, and 6 inches in Wauchula (recorded by the National Weather Service). Many of the flooding problems associated with the heavy rains were in the Horse Creek basin, where a 5-year recurrence interval flood occurred; 2-year floods occurred in most other basins in the area. More than 5,000 people were evacuated in west-central Florida because of the high water. In **South Dakota**, several intense, localized thunderstorms throughout the last half of June caused substantial runoff in several basins, personal injuries, and extensive damage to personal property, crops, and livestock.

Month-end index reservoir contents were in the below-average range at 34 of 100 reporting sites, compared with 31 of 100 at the end of May, and 35 of 100 at the end of June 1991, including most reservoirs in Nova Scotia, Nebraska, the Dakotas, Montana, Wyoming, Colorado, Utah, Idaho, Nevada, California and the Colorado River Storage Project. Contents were in the above-average range at 31 reservoirs (compared with 25 last month, and 28 a year ago), including most reservoirs in Massachusetts, New Jersey, the Carolinas, the Tennessee Valley, Oklahoma, Texas, New Mexico, and Arizona. Reservoirs with contents in the below-average range and significantly lower than last year (with normal maximum contents of at least 1,000,000 acre-feet) are: Lake McConaughy, Nebraska, Canyon Ferry and Hungry Horse, Montana; Boise River, Idaho; Upper Snake River system, Idaho-Wyoming; the Pathfinder system, Wyoming; Bear Lake, Idaho-Utah; Folsom, Pine Flat, Clair Engle, and Lake Berryessa, California. Two reservoirs had no usable storage (June average in parentheses): Lake Tahoe (71), California-Nevada, for the 21st consecutive month, and Rye Patch (63), Nevada, for the 2nd consecutive month. Graphs of contents for seven reservoirs are shown on page 12 with contents for the 100 reporting reservoirs given on page 13. Reservoir storage conditions near the end of June 1992 and June 1991 are shown on streamflow maps on page 15.

June levels at four master gages on the Great Lakes ranged from 0.13 foot higher (Lake Superior) to 0.16 foot lower (Lake Ontario) than those for May. Monthly means have now been in the normal range for 9 months on Lake Superior, 25 months on Lake Huron, 15 months on Lake Erie, and 4 months on Lake Ontario. June 1992 levels ranged from 0.03 foot (Lake Superior) to 0.63 foot lower (Lake Ontario), than those for June 1991. Stage hydrographs for the master gages on Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are on page 14.

(Continued on page 5)

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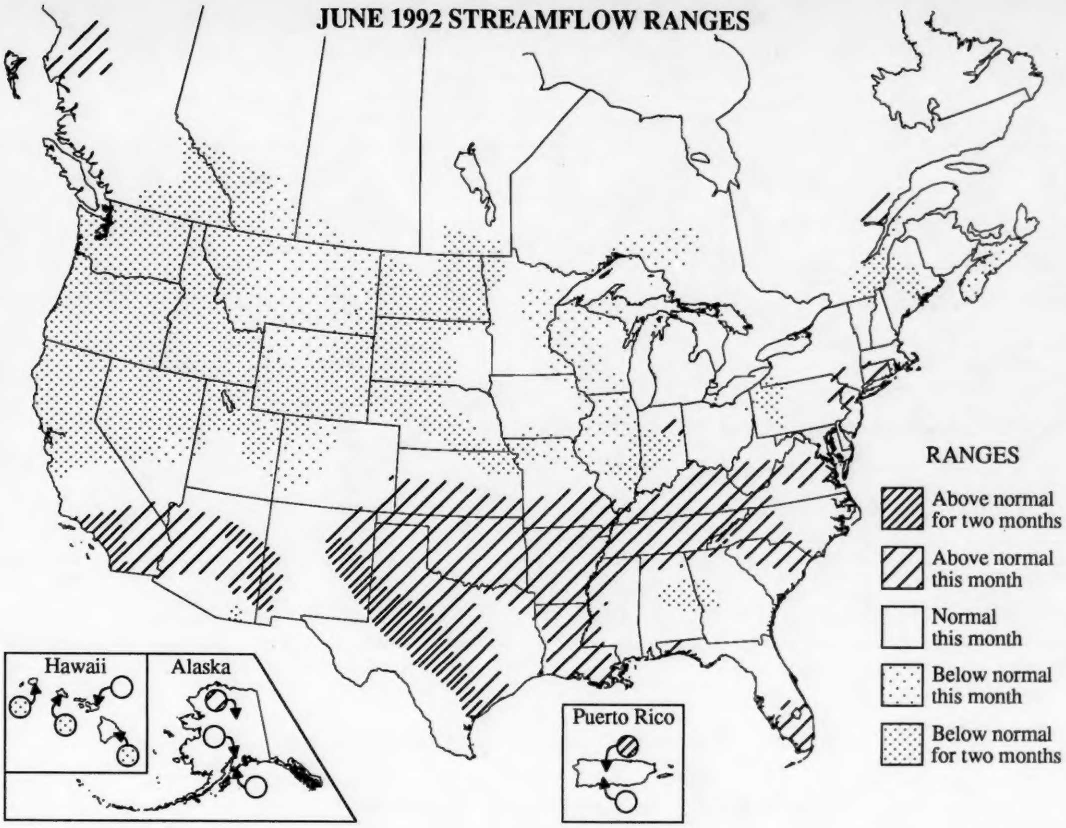
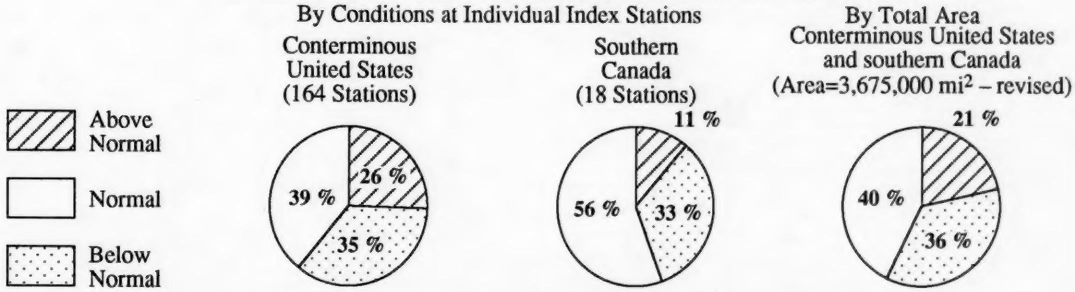
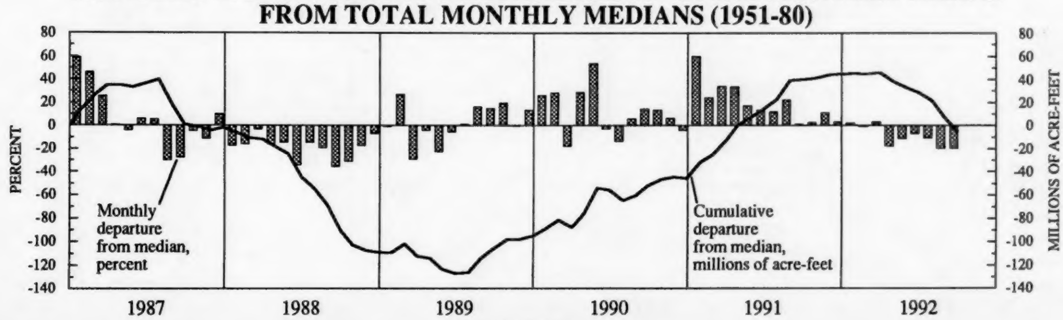
JUNE 1992 STREAMFLOW RANGES



SUMMARY OF JUNE 1992 STREAMFLOW RANGES



MONTHLY AND CUMULATIVE DEPARTURE OF TOTAL MONTHLY MEANS FROM TOTAL MONTHLY MEDIANS (1951-80)



NEW EXTREMES DURING JUNE 1992 AT STREAMFLOW INDEX STATIONS

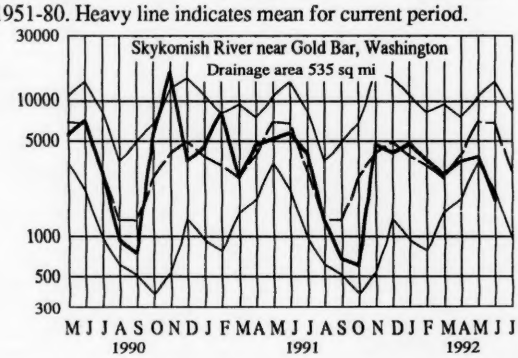
Station number	Stream and place of determination	Drainage area (square miles)	Years of record	Previous June extremes (period of record): Monthly mean in cfs (year)	Previous June extremes (period of record): Daily mean in cfs (year)	June 1992: Monthly mean in cfs	June 1992: Percent of median	June 1992: Daily mean in cfs	June 1992: Day
	LOW FLOWS								
11427000	North Fork American River at North Fork Dam, California	342	50	95.4 (1976)	45.0 (1977)	72.7	10	45.0	30
12134500	Skykomish River near Gold Bar, Washington	535	63	2,169 (1941)	1,360 (1940)	1,870	28	1,200	28
13269000	Snake River at Weiser, Idaho	69,200	81	7,168 (1977)	4,570 (1977)	[1]5,710	24	[1]4,520	7
13317000	Salmon River at White Bird, Idaho	13,550	79	9,430 (1987)	3,230 (1984)	8,910	21	6,590	26
14046500	John Day River at Service Creek, Oregon	5,090	63	416 (1931)	169 (1940)	306	13	178	11
14191000	Willamette River (adjusted) at Salem, Oregon	7,280	75	5,065 (1940)	3,630 (1940)	4,066	34	5,400	23
14301500	Wilson River near Tillamook, Oregon	161	61	164 (1982)	110 (1967)	117	42	82.0	28
	HIGH FLOWS								
09430500	Gila River near Gila, New Mexico	1,864	64	167 (1973)	536 (1952)	218	494	602	1
09448500	Gila River at Head of Safford Valley near Solomon, Arizona	7,896	77	388 (1973)	1,280 (1952)	753	1,394	2,456	1

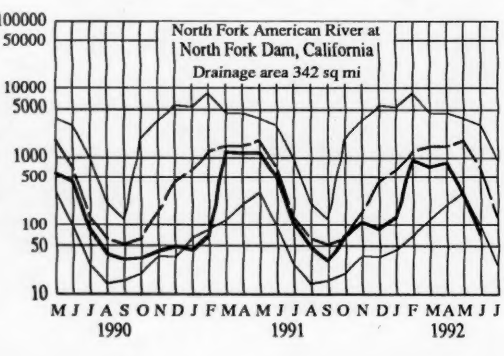
[1] All-time low.

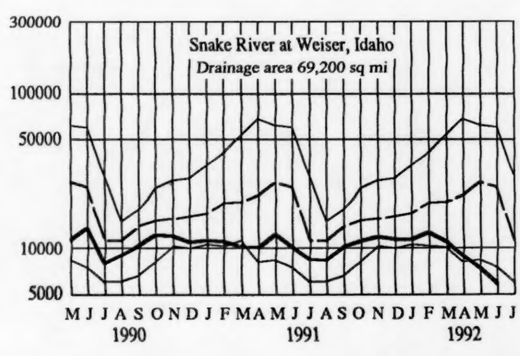
MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.

DISCHARGE IN CUBIC FEET PER SECOND

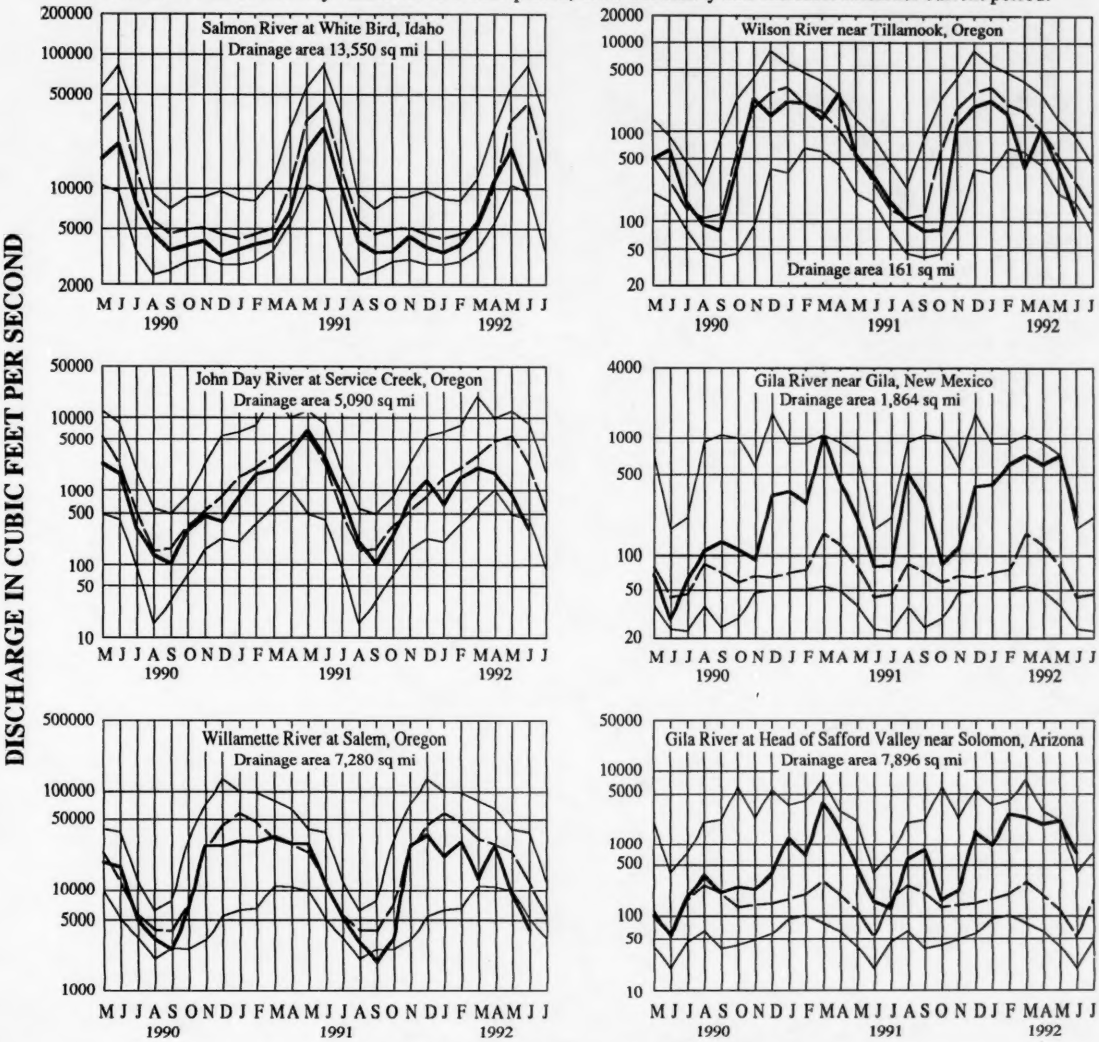






MONTHLY MEAN DISCHARGE OF SELECTED STREAMS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



Maps on page 15 show streamflow conditions during June 1992 and June 1991. June 1992 has about 31 percent more area in the above-normal range, about 140 percent more area in the below-normal range, and about 38 percent less area in the normal range than June 1991. Below-normal range streamflow occurred during both months in parts of California, Nevada, Utah, Colorado, Oregon, Idaho, Wyoming, the Dakotas, Minnesota, Kansas, Illinois, Indiana, Ohio, Pennsylvania, New York, Vermont, Quebec, Maine, and Nova Scotia. Above-normal range streamflow occurred during both months in parts of Arizona, New Mexico, Texas, Oklahoma, Louisiana, Mississippi, Alabama, Georgia, Florida, the Carolinas, and Virginia. Both maps also show reservoir storage near the end of the month at all reporting index reservoir stations for comparison with streamflow.

Graphs for 12 hydrologic areas compare monthly streamflow for the 1991 and 1992 water years with median monthly streamflow for 1951-80 (page 16) and also show (page 17) monthly percent departure of streamflow from median for the 1987-92 water years. Streamflow increased from that for May in the Florida and Gulf of Mexico, Missouri River, Southern Great Plains and Rio Grande, and Pacific Slope basins, and decreased in the other eight basins. Streamflow was above median in the Atlantic Slope, Florida and Gulf of Mexico, Ohio River, and also the Southern Great Plains and Rio Grande basins, and below median in the other eight basins.

Maps on page 18 show streamflow conditions for spring 1992 and spring 1991. Spring 1992 has 55 percent less area in the above-normal range, 120 percent more area in the below-normal range, and about 22 percent less area in the normal range than spring 1991. Below-normal range streamflow occurred in both months in parts of California, Nevada, Oregon, Washington, Idaho, Montana, Alberta, Utah, Colorado, Wyoming, Kansas, Nebraska, the Dakotas, Minnesota, Wisconsin, Tennessee, Kentucky, Illinois, Indiana, West Virginia, Ohio, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine. Above-normal range streamflow occurred during both months in parts of Alaska, Arizona, New Mexico, Texas, Oklahoma, North Carolina, and Quebec. Both maps also show reservoir storage near the end of June at all reporting index reservoir stations for comparison with streamflow.

LOCATION OF *NATIONAL WATER CONDITIONS* STREAMFLOW INDEX STATIONS IN THE PACIFIC NORTHWEST(OREGON, WASHINGTON, IDAHO, AND MONTANA)

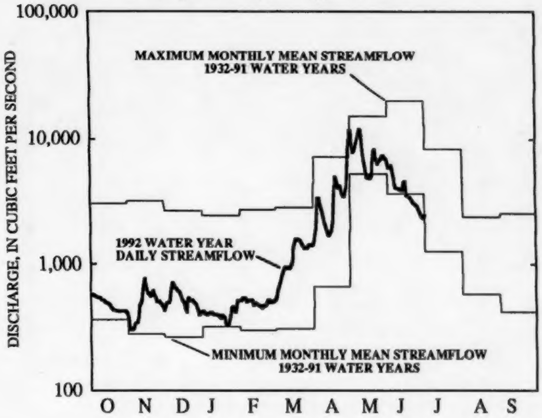
PACIFIC NORTHWEST (OREGON, WASHINGTON, IDAHO, AND MONTANA) STREAMFLOW

The drought-plagued Pacific Northwest was warmer and drier than usual until the end of June. Higher-than-normal precipitation near the end of June was "too little, too late." The drought is causing water purveyors to impose water-use restrictions, and is generating heated debates about allocating available water for irrigation or protection of fisheries resources. Southern and eastern Oregon are particularly hard hit. Dennis Gettman, a National Weather Service meteorologist stationed in Medford, stated that "This particular period, starting in 1984, is, for Medford, the driest 7-year period since we began taking records in 1911." Farmers in the Klamath Basin in Oregon are facing deeper cuts in an already diminished irrigation supply. Portland, Oregon, followed the lead of Seattle by imposing mandatory restrictions on use of water from the city's supply reservoirs. The restricted use affects a large number of users because several surrounding water districts depend on supply from Portland's Bull Run watershed.

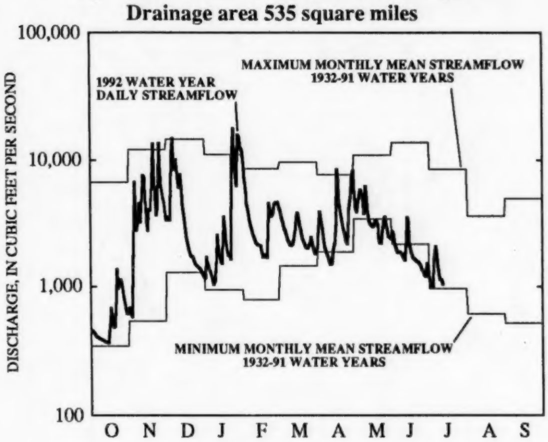
The drought has eased slightly in northern Washington and Idaho because of June rains, but the southern portions of those States are still very dry. According to the "Idaho Statesman" newspaper, the major irrigation delivery systems that divert water from the Boise River will be forced to turn off water to irrigators in mid-August. Reservoir storage in the Boise basin at the end of June was about 22 percent of capacity.

In north-central Washington, the Oroville-Tonasket Irrigation District is diverting water from the Similkameen River into Osoyoos Lake for the first time since the 1987 drought year. Total storage in the Yakima Basin in central Washington was about 69 percent of average at the end of June. Estimates are that junior water rights holders will receive only 58 percent of their normal demand.

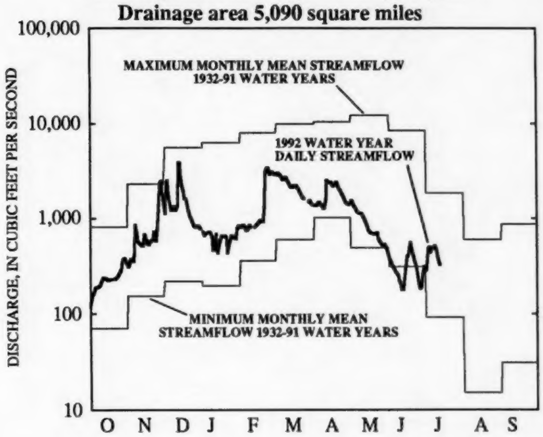
Middle Fork Flathead River near West Glacier, Montana
Drainage area 1,128 square miles



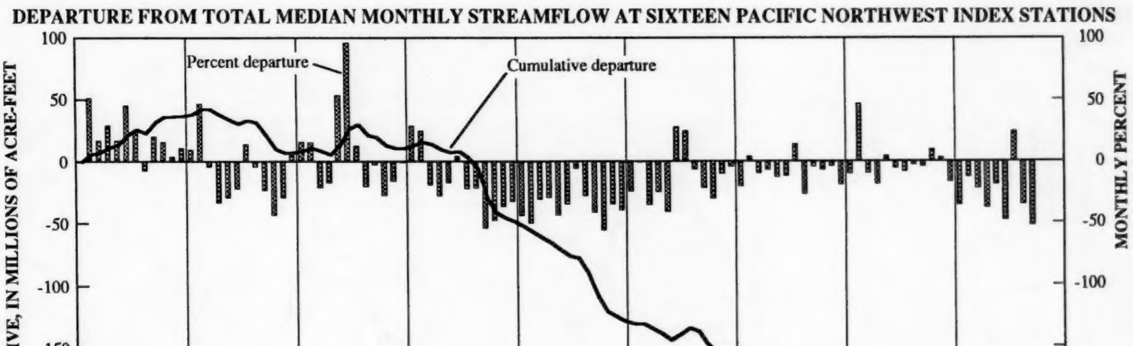
Skykomish River near Goldbar, Washington
Drainage area 535 square miles



John Day River at Service Creek, Oregon
Drainage area 5,090 square miles

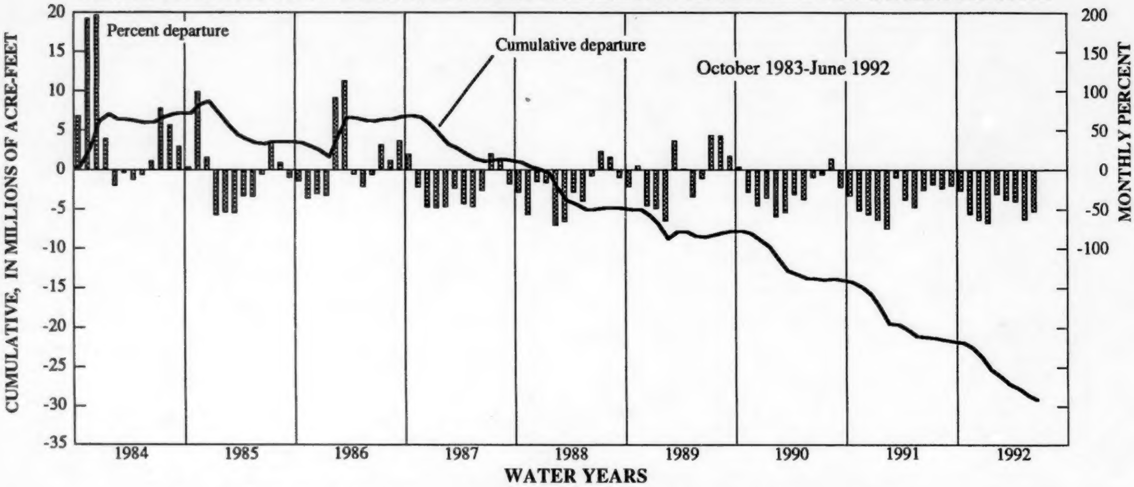


DEPARTURE FROM TOTAL MEDIAN MONTHLY STREAMFLOW AT SIXTEEN PACIFIC NORTHWEST INDEX STATIONS

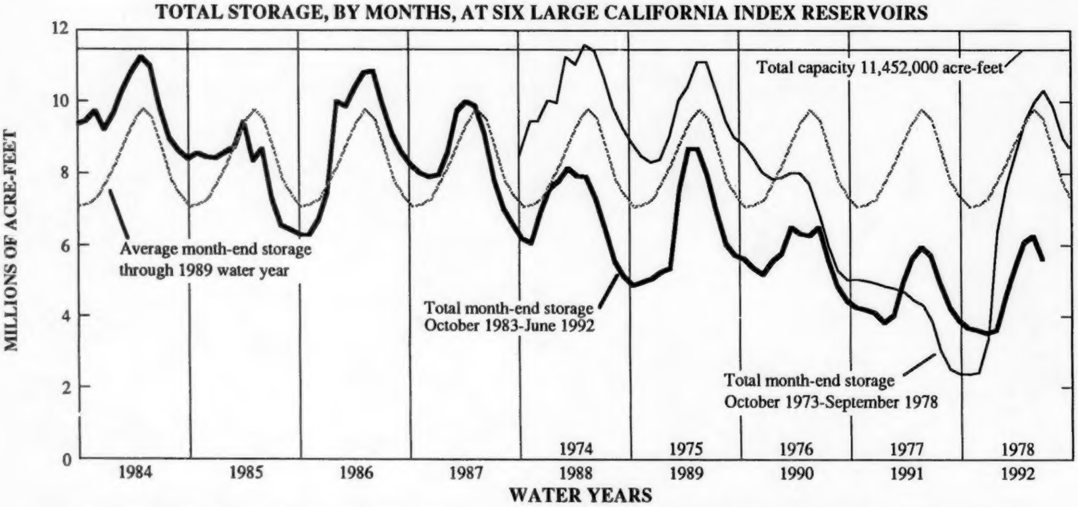


CALIFORNIA STREAMFLOW, COMBINED RESERVOIR CONTENTS, AND GROUND-WATER LEVELS

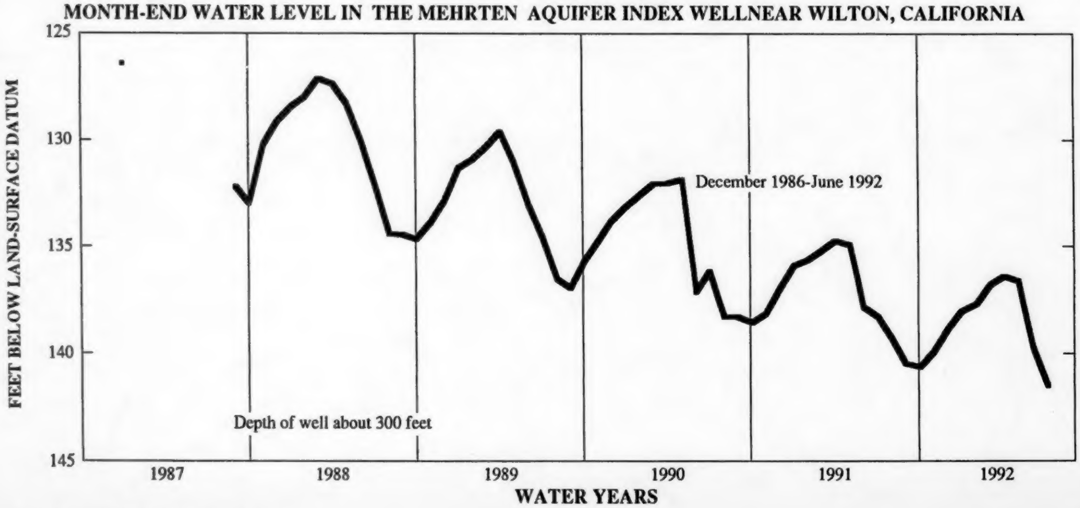
DEPARTURE FROM TOTAL MEDIAN MONTHLY STREAMFLOW AT SIX CALIFORNIA INDEX STATIONS



TOTAL STORAGE, BY MONTHS, AT SIX LARGE CALIFORNIA INDEX RESERVOIRS

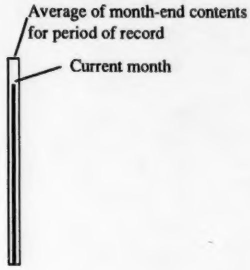


MONTH-END WATER LEVEL IN THE MEHRTEN AQUIFER INDEX WELLNEAR WILTON, CALIFORNIA

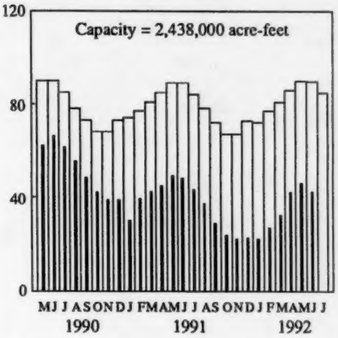


CALIFORNIA RESERVOIR INDEX STATIONS

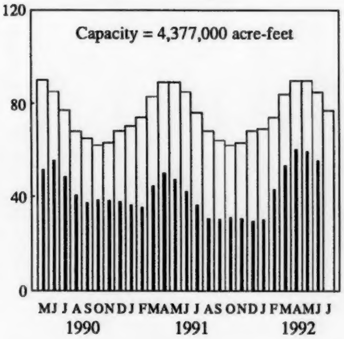
PERCENT OF NORMAL CAPACITY



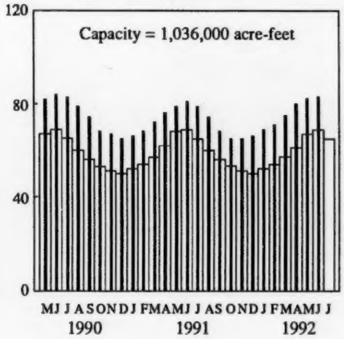
1. Clair Engle Lake near Lewiston



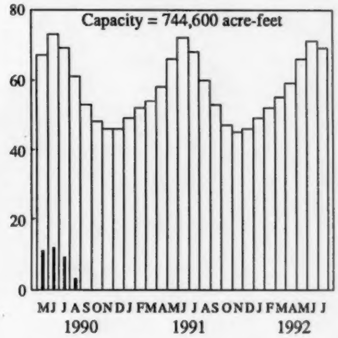
2. Shasta Lake near Redding



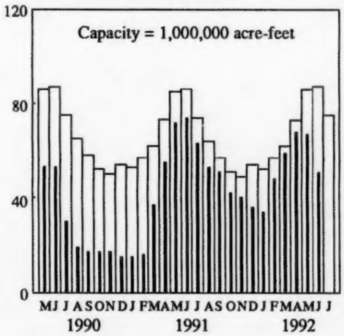
3. Lake Almanor near Prattville



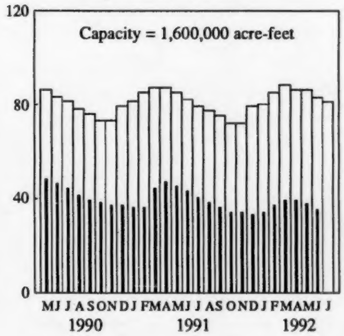
4. Lake Tahoe at Tahoe City



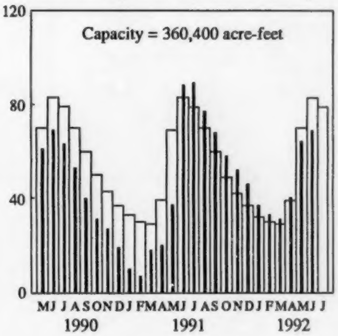
5. Folsom Lake near Folsom



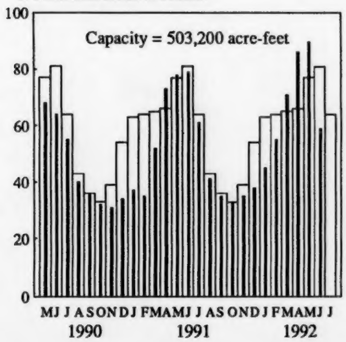
6. Lake Berryessa near Winters



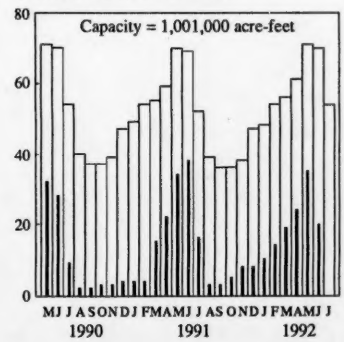
7. Hetch Hetchy Reservoir at Hetch Hetchy



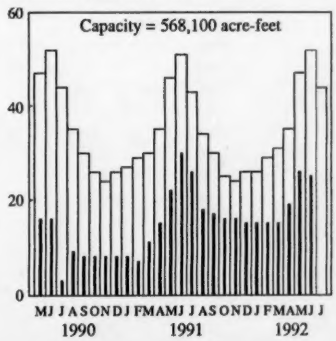
8. Millerton Lake at Friant



9. Pine Flat Lake near Piedra

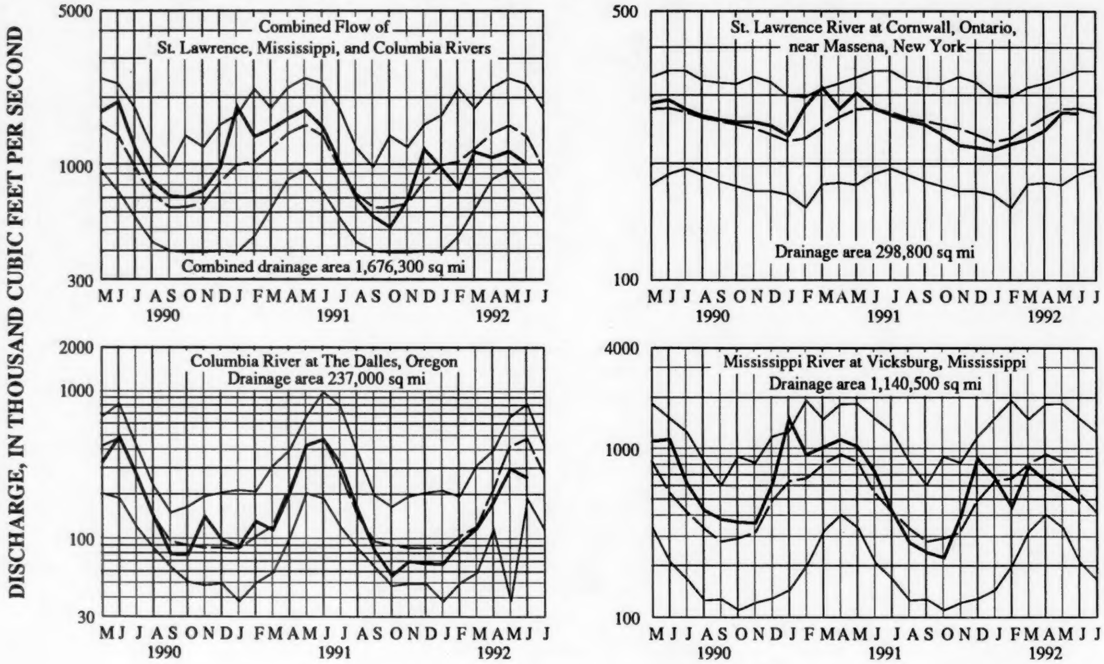


10. Isabella Lake near Lake Isabella



HYDROGRAPHS FOR THE "BIG THREE" RIVERS

Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period.



Provisional data; subject to revision

DISSOLVED SOLIDS AND WATER TEMPERATURES, FOR JUNE 1992, AT DOWNSTREAM SITES ON FIVE LARGE RIVERS

Station number	Station name	June data of following calendar years	Stream discharge during month Mean (cfs)	Dissolved-solids concentration[1] Minimum (mg/L)	Dissolved-solids concentration[1] Maximum (mg/L)	Dissolved-solids discharge[1] Mean (tons per day)	Dissolved-solids discharge[1] Minimum (tons per day)	Dissolved-solids discharge[1] Maximum (tons per day)	Water temperature[2] Mean in °C	Water temperature[2] Minimum in °C	Water temperature[2] Maximum in °C
01463500	Delaware River at Trenton,	1992	14,860	69	110	3,480	1,670	7,160	20.5	16.0	24.5
	New Jersey, (Morrisville,	1945-91	9,610	60	143	[3]2,606	495	22,100	[3]23.0	13.5	34.0
	Pennsylvania)	(Extreme yr)		(1945)	(1965)		(1965)	(1973)			
			[4]7,176								
07289000	Mississippi River at	1992	482,300	207	258	318,200	248,800	375,400	23.0	19.0	26.0
	Vicksburg, Mississippi	1976-91	668,500	176	330	310,000	34,400	837,000	21.0	17.0	31.0
		(Extreme yr)		(1981)	(1988)		(1978)	(1984)			
			[4]546,500								
03612500	Ohio River at lock and dam 53,	1992	193,000	172	236	...	68,700	180,000	...	19.0	23.5
	near Grand Chain, Illinois,	1955-91	220,400	111	300	...	27,000	731,000	...	16.5	30.5
	(streamflow station at Metropolis,	(Extreme yr)		(1974)	(1970)		(1977)	(1983)			
	Illinois)		[4]175,700								
06934500	Missouri River at Hermann,	1992	59,200	365	433	65,400	53,400	85,300	25.0	23.0	28.0
	Missouri. (60 miles west of	1976-91	116,100	207	499	104,000	44,000	215,000	25.0	19.0	29.5
	St. Louis, Missouri)	(Extreme yr)		(1977)	(1988)		(1977)	(1984)			
			[4]86,260								
14128910	Columbia River at	1992	181,000	79	88	40,500	31,500	45,600	17.5	16.5	19.5
	Oregon (streamflow station at	1976-91	252,900	61	107	54,800	19,100	103,000	16.0	12.5	19.5
	The Dalles, Oregon)	(Extreme yr)		(1976)	(1977)		(1977)	(1983)			
			[4]481,150								

[1]Dissolved-solids concentrations, when not analyzed directly, are calculated on basis of measurements of specific conductance.
[2]To convert °C to °F: [(1.8 x °C) + 32] = °F.
[3]Mean for 8-year period (1983-91).
[4]Median of monthly values for 30-year reference period, water years 1951-80, for comparison with data for current month.

Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING JUNE 1992

Station number	Stream and place of determination	Drainage area (square miles)	Average discharge through September 1985 (cubic feet per second)	June 1992: Monthly mean discharge (cubic feet per second)	June 1992: Percent of median monthly discharge 1951–80	June 1992: Change in discharge from previous month (percent)	June 1992: Discharge near end of month: Cubic feet per second	June 1992: Discharge near end of month: Million gallons per day	Date
01014000	St. John River below Fish River at Fort Kent, Maine ...	5,665	9,758	9,372	99	–60	13,500	8,730	30
01318500	Hudson River at Hadley, New York ...	1,664	2,908	2,690	130	–45	850	549	30
01357500	Mohawk River at Cohoes, New York ...	3,456	5,683	4,070	154	–30	1,300	840	30
01463500	Delaware River at Trenton, New Jersey ...	6,780	11,670	* 14,860	207	61	6,090	3,940	30
01570500	Susquehanna River at Harrisburg, Pennsylvania ...	24,100	34,340	21,820	117	–25	9,960	6,440	30
01646500	Potomac River near Washington, District of Columbia ...	11,560	[1]11,500	[1]9,650	127	–28	...	...	...
02105500	Cape Fear River at William O. Huske Lock, near Tarheel, North Carolina.	4,852	5,002	4,420	174	144	...	...	...
02131000	Pee Dee River at Peedee, South Carolina ...	8,830	9,871	* 14,980	195	37	7,530	4,870	30
02226000	Altamaha River at Doctortown, Georgia ...	13,600	13,730	8,040	105	50	5,540	3,580	29
02320500	Suwannee River at Branford, Florida ...	7,880	6,986	4,439	84	–17	4,420	2,860	30
02358000	Apalachicola River at Chattahoochee, Florida ...	17,200	22,420	13,420	84	–1	13,700	8,850	30
02467000	Tombigbee River at Demopolis lock and dam, near Coatopa, Alabama.	15,385	23,520	8,288	113	144	2,730	1,760	30
02489500	Pearl River near Bogalusa, Louisiana ...	6,573	9,880	4,024	101	22	3,130	2,020	30
03049500	Allegheny River at Natrona, Pennsylvania ...	11,410	[1]19,580	† [1]4,154	44	–71	3,440	2,220	29
03085000	Monongahela River at Braddock, Pennsylvania ...	7,337	[1]12,480	[1]4,279	72	–56	2,490	1,610	29
03193000	Kanawha River at Kanawha Falls, West Virginia ...	8,367	12,550	* 22,320	318	58	7,760	5,020	29
03234500	Scioto River at Higby, Ohio ...	5,131	4,583	3,167	105	2	1,680	1,080	30
03294500	Ohio River at Louisville, Kentucky[2] [#] ...	91,170	115,800	102,000	163	–10	50,800	32,800	28
03377500	Wabash River at Mount Carmel, Illinois ...	28,635	27,660	† 13,610	66	–25	15,800	10,200	30
03469000	French Broad River below Douglas Dam, Tennessee[3] [#].	4,543	[1]6,739	* [1]10,700	199	6	...	...	...
04084500	Fox River at Rapide Croche Dam, near Wrightstown, Wisconsin.[2]	6,010	4,238	3,296	90	–45	2,300	1,480	30
04264331	St. Lawrence River at Cornwall, Ontario, near Massena, New York.[4] [#]	298,800	243,900	272,000	97	0	262,000	169,000	30
02NG001	St. Maurice River at Grand Mere, Quebec ...	16,300	24,910	19,100	65	–78	11,600	7,530	30
05082500	Red River of the North at Grand Forks, North Dakota ...	30,100	2,593	† 2,069	50	0	1,960	1,270	30
05133500	Rainy River at Manitou Rapids, Minnesota ...	19,400	12,920	17,100	83	–33	14,900	9,630	24
05330000	Minnesota River near Jordan, Minnesota ...	16,200	3,680	7,815	136	13	12,700	8,210	30
05331000	Mississippi River at St. Paul, Minnesota[#] ...	36,800	[1]11,020	13,570	81	–23	21,200	13,700	30
05365500	Chippewa River at Chippewa Falls, Wisconsin ...	5,650	5,149	† 2,258	43	–58	2,400	1,550	30
05407000	Wisconsin River at Muscoda, Wisconsin ...	10,400	8,710	† 4,660	47	–52	2,860	1,850	29
05446500	Rock River near Joslin, Illinois ...	9,549	6,080	† 3,488	60	–50	2,810	1,820	30
05474500	Mississippi River at Keokuk, Iowa[#] ...	119,000	63,790	† 49,670	58	–54	48,700	31,500	30
06214500	Yellowstone River at Billings, Montana ...	11,795	7,056	† 19,730	68	30	21,300	13,800	30
06934500	Missouri River at Hermann, Missouri[#] ...	524,200	80,880	† 59,220	69	–8	52,200	33,700	30
07289000	Mississippi River at Vicksburg, Mississippi[5] [#] ...	1,140,500	584,000	482,300	88	–16	500,000	320,000	29
07331000	Washita River near Dickson, Oklahoma ...	7,202	1,402	* 5,984	434	161	3,270	2,110	28
08276500	Rio Grande below Taos Junction Bridge, near Taos, New Mexico.	9,730	742	1,003	138	–8	540	349	30
09315000	Green River at Green River, Utah ...	44,850	6,391	† 4,300	25	–45	...	...	...
11425500	Sacramento River at Verona, California ...	21,251	19,430	† 5,886	52	–1	...	...	...
13269000	Snake River at Weiser, Idaho ...	69,200	18,520	† 5,710	24	–19	6,310	4,080	30
13317000	Salmon River at White Bird, Idaho ...	13,550	11,390	† 8,910	21	–54	7,700	4,980	30
13342500	Clearwater River at Spalding, Idaho ...	9,570	15,510	† 9,520	24	–66	6,940	4,480	30
14105700	Columbia River at The Dalles, Oregon[6] [#] ...	237,000	[1]193,500	† [1]263,000	55	–13	160,000	103,000	30
14191000	Willamette River at Salem, Oregon ...	7,280	[1]23,690	† [1]4,066	34	–54	6,210	4,010	30
15515500	Tanana River at Nenana, Alaska ...	25,600	23,810	* 67,850	146	167	64,200	41,500	30
08MF005	Fraser River at Hope, British Columbia ...	83,800	96,250	202,700	82	20	190,000	123,000	30

[#]Indicates stations excluded from the combination bar/line graph. See Explanation of Data.

[1]Adjusted.

[2]Records furnished by Corps of Engineers.

[3]Records furnished by Tennessee Valley Authority.

[4]Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y., when adjusted for storage in Lake St. Lawrence.

[5]Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.

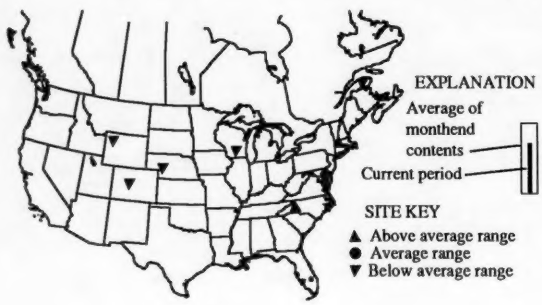
[6]Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.

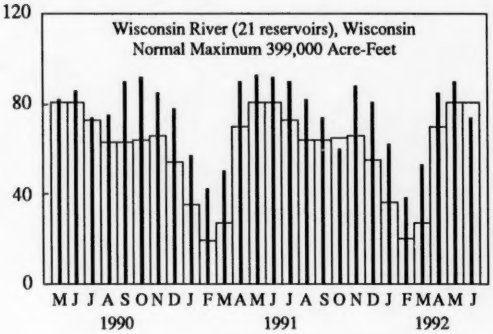
* Above–normal range

† Below–normal range

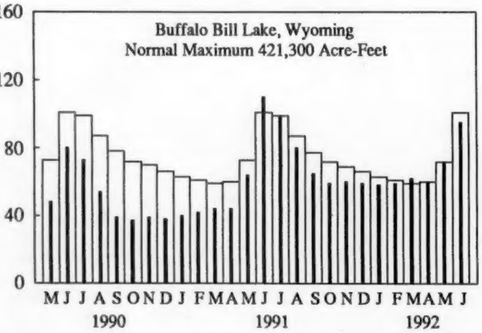
USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF JUNE 1992

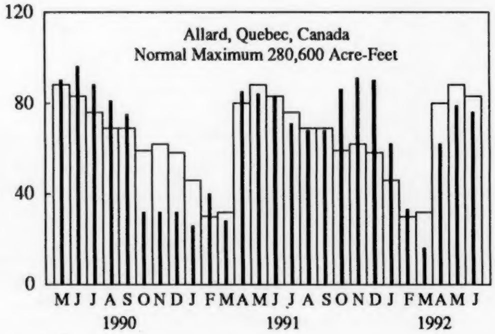
[Contents are example in percent of reservoir (system) capacity. The usable storage capacity of each reservoir (system) is shown in the column headed "Normal maximum"]

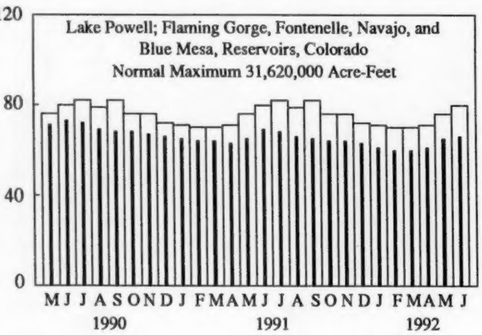


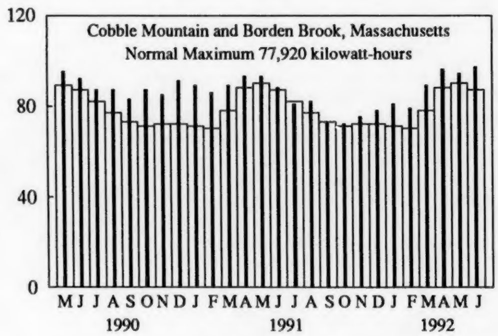


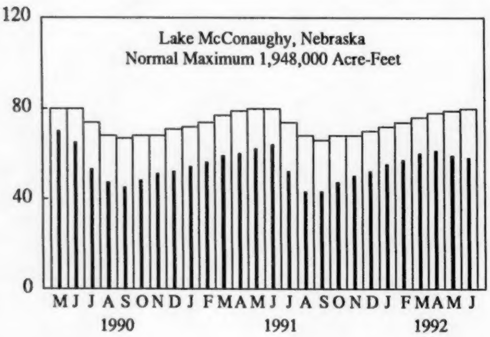
PERCENT OF NORMAL MAXIMUM

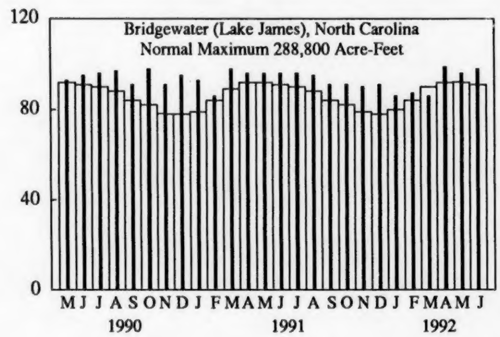












Provisional data; subject to revision

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS NEAR END OF JUNE 1992

[Contents are expressed in percent of reservoir or reservoir system capacity. The usable capacity of reservoir or reservoir system is shown in the column headed "Normal maximum"]

Reservoir or reservoir system Principal uses: F-Flood control I-Irrigation M-Municipal P-Power R-Recreation W-Industrial	Percent of normal maximum: End of June 1992	End of June 1991	Average for end of June	End of May 1992	Normal maximum (acre-feet)[1]
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	† 51	62	71	60	[2]226,300
QUEBEC					
Allard (P)	† 76	83	83	79	280,600
Gouin (P)	67	78	68	63	6,954,000
MAINE					
Seven Reservoir Systems (MP)	91	87	86	89	4,107,000
NEW HAMPSHIRE					
First Connecticut Lake (P)	87	83	90	89	76,450
Lake Francis (FPR)	91	88	87	92	99,310
Lake Winnipesaukee (PR)	94	85	96	89	165,700
VERMONT					
Harriman (P)	85	70	83	83	116,200
Somerset (P)	86	78	86	83	57,390
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	* 97	88	87	94	77,920
NEW YORK					
Great Sacandaga Lake (FPR)	94	88	92	101	786,700
Indian Lake (FMP)	95	96	100	96	103,300
New York City Reservoir System (MW)	92	88	96	88	1,680,000
NEW JERSEY					
Wanaque (M)	* 95	79	89	99	85,100
PENNSYLVANIA					
Allegheny (FPR)	46	45	49	48	1,180,000
Pymatuning (FMR)	96	90	97	99	188,000
Raystown Lake (FR)	67	67	64	67	761,900
Lake Wallenpaupack (PR)	82	77	84	90	157,800
MARYLAND					
Baltimore Municipal System (M)	77	93	93	76	61,900
NORTH CAROLINA					
Bridgewater (Lake James) (P)	* 98	96	91	96	288,800
Narrows (Badin Lake) (P)	93	94	96	95	128,900
High Rock Lake (P)	* 86	85	79	81	234,800
SOUTH CAROLINA					
Lake Murray (P)	* 92	94	81	94	1,614,000
Lakes Marion and Moultrie (P)	* 90	89	76	85	1,777,000
SOUTH CAROLINA-GEORGIA					
Strom Thurmond Lake (FP)	74	87	71	74	1,730,000
GEORGIA					
Burton (PR)	98	99	94	98	104,000
Sinclair (MPR)	89	91	89	89	214,000
Lake Sidney Lanier (FMPR)	64	66	64	62	1,686,000
ALABAMA					
Lake Martin (P)	97	98	92	99	1,375,000
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	* 70	78	62	66	2,293,000
Douglas Lake (FPR)	* 82	85	68	82	1,395,000
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	* 90	94	81	88	1,012,000
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	* 86	87	69	82	2,880,000
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	* 94	94	82	78	1,478,000
WISCONSIN					
Chippewa and Flambeau (PR)	88	94	87	92	365,000
Wisconsin River (21 Reservoirs) (PR)	† 74	92	81	90	399,000
MINNESOTA					
Mississippi River Headwater System (FMR)	37	43	39	38	1,640,000
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	† 63	66	87	60	22,700,000
SOUTH DAKOTA					
Angostura (I)	† 76	92	85	76	130,770
Belle Fourche (I)	† 31	61	71	36	185,200
Lake Francis Case (FIP)	† 78	77	86	76	4,589,000
Lake Oahe (FIP)	† 63	67	75	64	22,240,000
Lake Sharpe (FIP)	102	102	101	102	1,697,000
Lewis and Clark Lake (FIP)	† 88	81	94	88	432,000
NEBRASKA					
Lake McConaughy (IP)	† 58	64	80	59	1,948,000
OKLAHOMA					
Eufaula (FPR)	* 107	98	97	99	2,378,000
Keystone (FPR)	* 129	89	103	81	661,000
Tenkiller Ferry (FPR)	* 111	103	102	104	628,200
Lake Altus (FIMR)	* 101	92	71	100	133,000
Lake O'The Cherokees (FPR)	100	95	95	97	1,492,000
OKLAHOMA-TEXAS					
Lake Texoma (FMPRW)	107	106	102	103	2,722,000
TEXAS					
Bridgeport (IMW)	* 97	94	58	97	386,400
Canyon (FMR)	* 103	91	88	121	385,600
International Amistad (FIMPW)	* 98	88	80	99	3,497,000
International Falcon (FIMPW)	* 104	52	63	103	2,668,000
Livingston (IMW)	* 99	100	93	104	1,788,000
Possum Kingdom (IMPRW)	95	93	97	92	570,200
Red Bluff (P)	* 49	17	27	39	307,000
Toledo Bend (P)	98	97	93	97	4,472,000
Twin Buttes (FIM)	* 82	47	35	77	177,800
Lake Kemp (IMW)	* 99	101	93	94	268,000
Lake Meredith (FMW)	* 43	34	37	37	796,900
Lake Travis (FIMPRW)	* 102	100	83	103	1,144,000
MONTANA					
Canyon Ferry (FIMPR)	† 75	96	93	73	2,043,000
Fort Peck (FPR)	† 58	63	87	59	18,910,000
Hungry Horse (FIPR)	† 76	92	93	76	3,451,000
WASHINGTON					
Ross (PR)	94	88	90	69	1,052,000
Franklin D. Roosevelt Lake (IP)	94	101	98	73	5,022,000
Lake Chelan (PR)	97	91	96	68	676,100
Lake Cushman (PR)	101	102	97	98	359,500
Lake Merwin (P)	101	104	104	102	245,600
IDAHO					
Boise River (4 Reservoirs) (FIP)	† 24	51	85	35	1,235,000
Coeur d'Alene Lake (P)	* 98	95	85	97	238,500
Pend Oreille Lake (FP)	98	98	97	75	1,561,000
IDAHO-WYOMING					
Upper Snake River (8 Reservoirs) (MP)	† 50	89	84	64	4,401,000
WYOMING					
Boysen (FIP)	† 72	104	88	67	802,000
Buffalo Bill (IP)	† 95	110	101	71	421,300
Keyhole (F)	† 13	25	48	13	193,800
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	† 44	56	67	43	3,056,000
COLORADO					
John Martin (FIR)	† 9	7	24	13	364,400
Taylor Park (IR)	† 81	96	93	72	106,200
Colorado-Big Thompson Project (I)	† 69	69	75	61	730,300
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	† 66	69	80	65	31,620,000
UTAH-IDAHO					
Bear Lake (IPR)	† 27	41	71	32	1,421,000
CALIFORNIA					
Folsom (FIMPR)	† 51	74	85	67	1,000,000
Hetch Hetchy (MP)	† 69	88	83	64	360,400
Isabella (FIR)	† 25	30	50	26	568,100
Pine Flat (FIR)	† 20	38	68	35	1,001,000
Clair Engle Lake (Lewiston) (FP)	† 42	48	87	46	2,438,000
Lake Almanor (P)	* 83	81	69	82	1,036,000
Lake Berryessa (FIMRW)	† 35	43	81	37	1,600,000
Millerton Lake (FI)	† 59	79	81	89	503,200
Shasta Lake (FIPR)	† 55	42	84	59	4,377,000
CALIFORNIA-NEVADA					
Lake Tahoe (IMPRW)	†0	0	71	0	744,600
NEVADA					
Rye Patch (I)	† 0	2	63	0	194,300
ARIZONA-NEVADA					
Lake Mead and Lake Mohave (FIMP)	75	75	75	76	27,970,000
ARIZONA					
San Carlos (IP)	* 72	48	25	77	935,100
Salt and Verde River System (IMPR)	* 79	91	51	84	2,019,100
NEW MEXICO					
Conchas (FIR)	* 95	52	82	93	315,700
Elephant Butte and Caballo (FIPR)	* 92	70	45	92	2,394,000

[1]1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day.

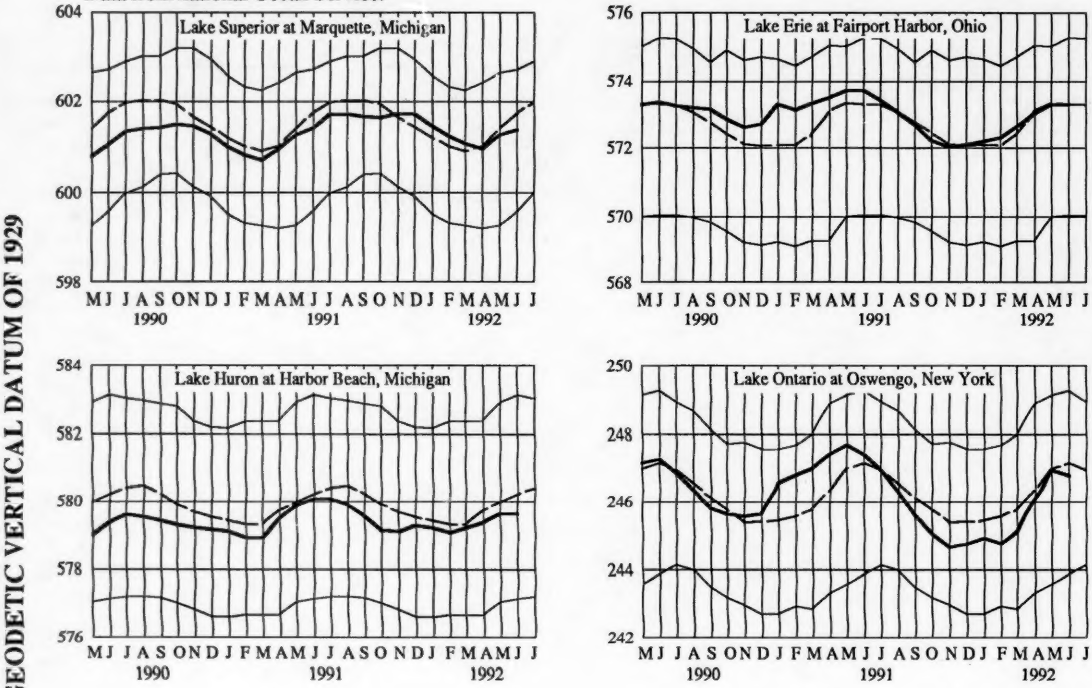
[2]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

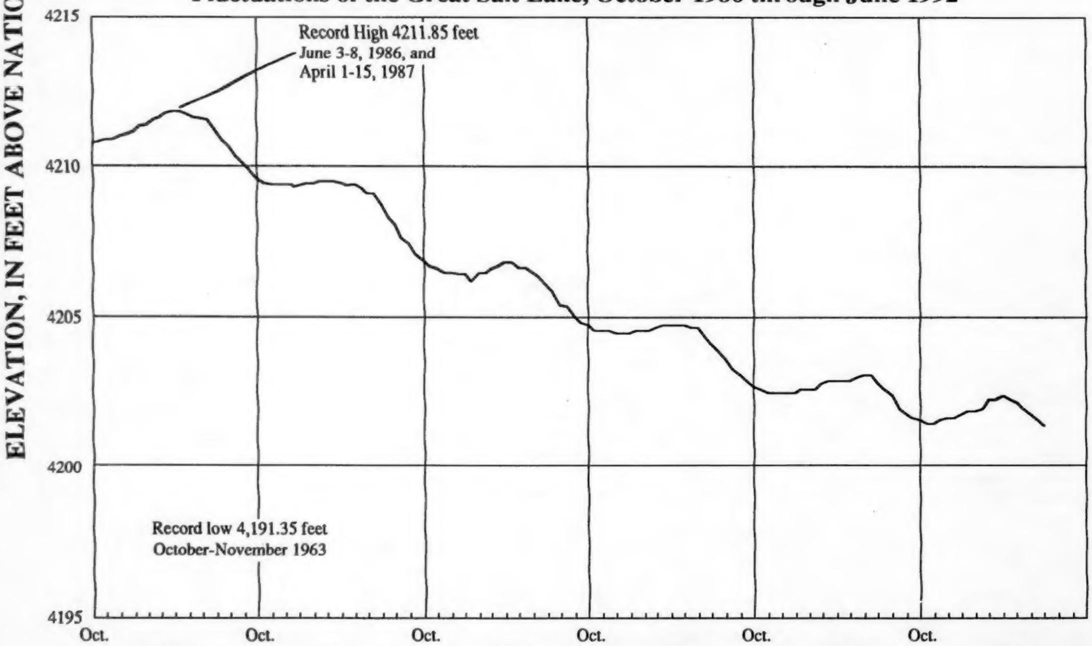
* Above-average range

† Below-average range

GREAT LAKES ELEVATIONS

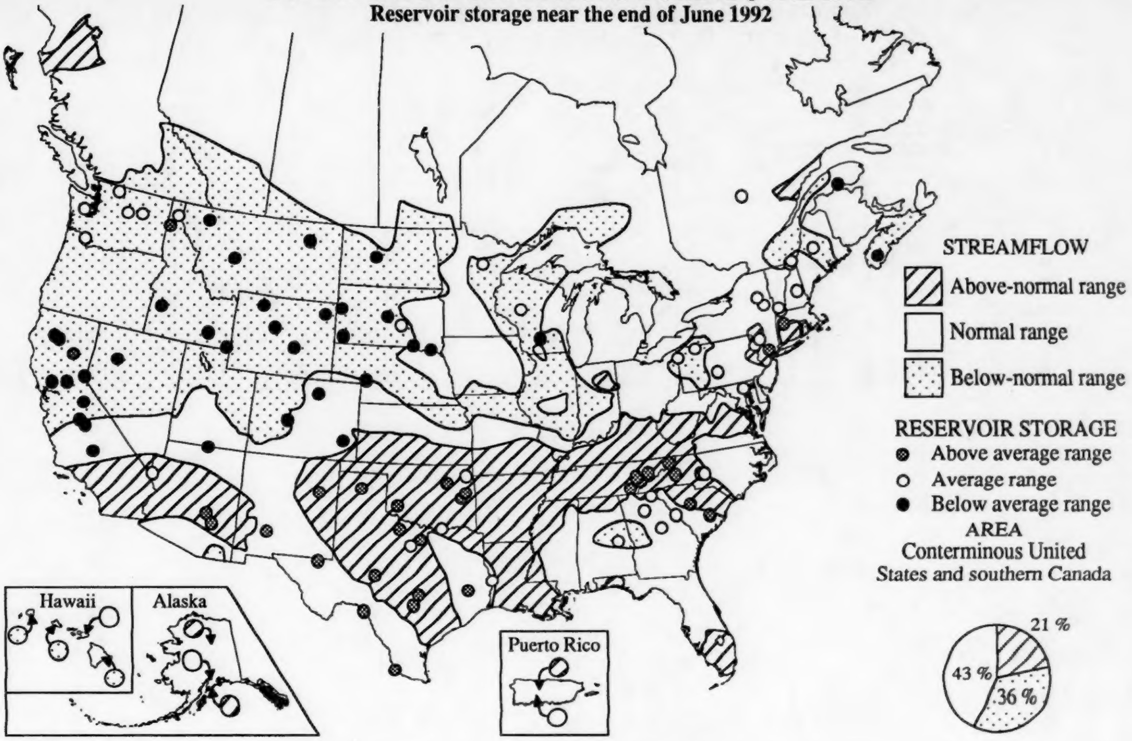
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates median of monthly values for reference period, 1951-80. Heavy line indicates mean for current period. Data from national Ocean Service.





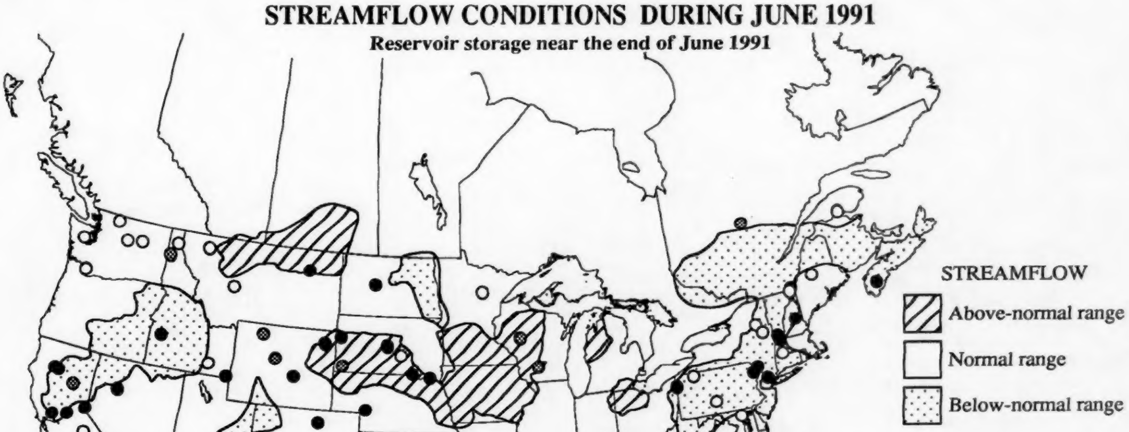
STREAMFLOW CONDITIONS DURING JUNE 1992

Reservoir storage near the end of June 1992

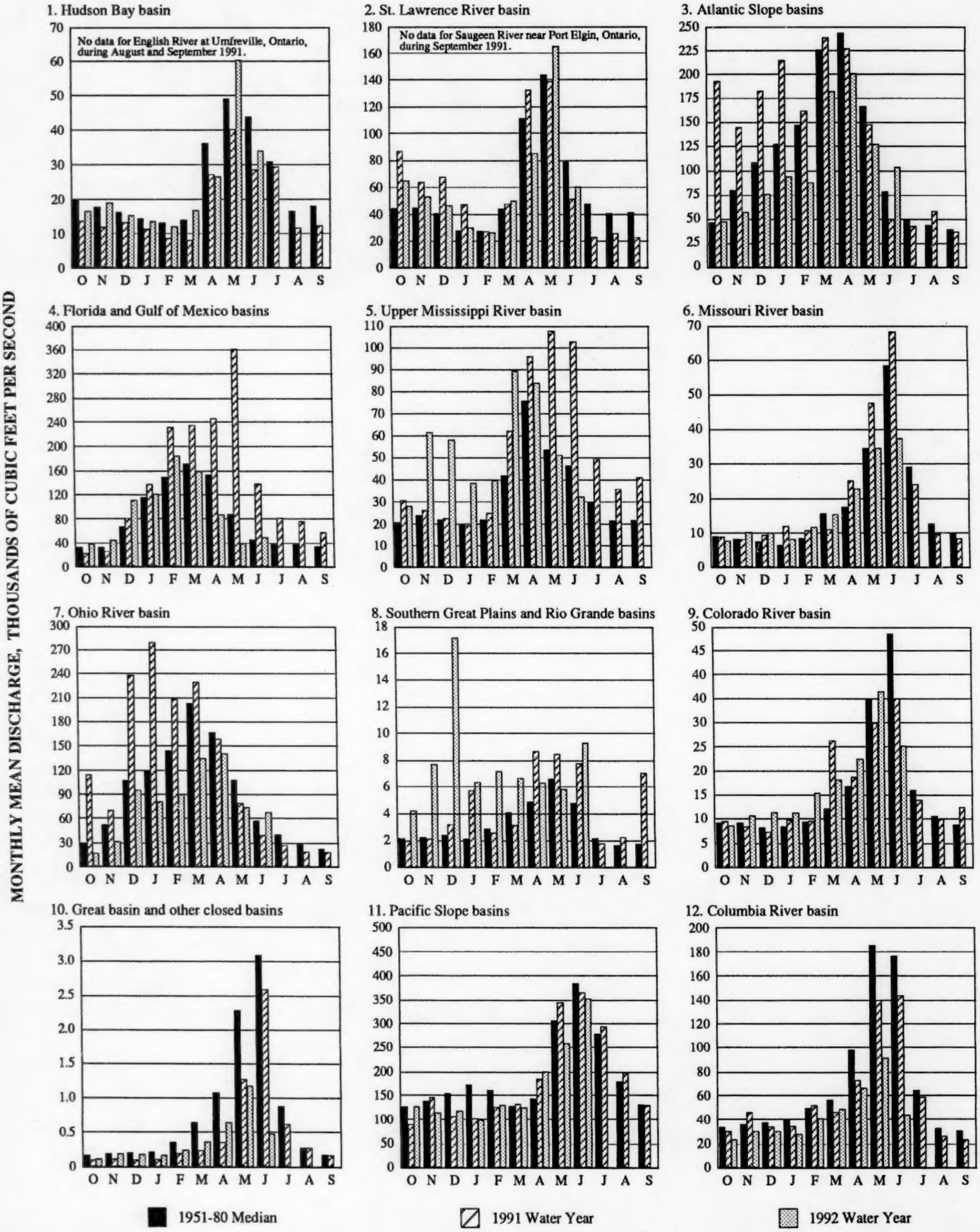


STREAMFLOW CONDITIONS DURING JUNE 1991

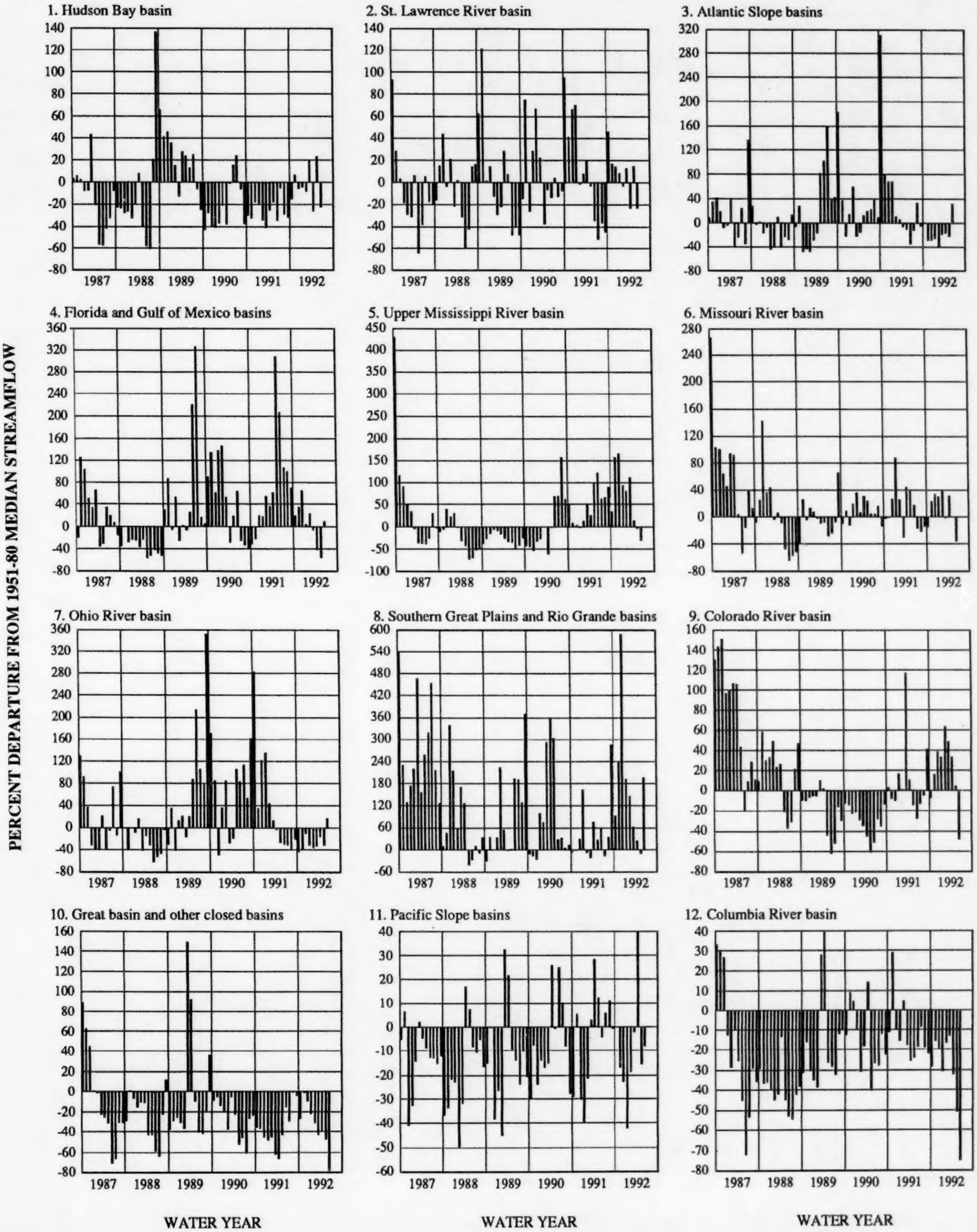
Reservoir storage near the end of June 1991



ACTUAL MONTHLY STREAMFLOW, 1991 AND 1992 WATER YEARS, COMPARED WITH MEDIAN MONTHLY STREAMFLOW, 1951-80



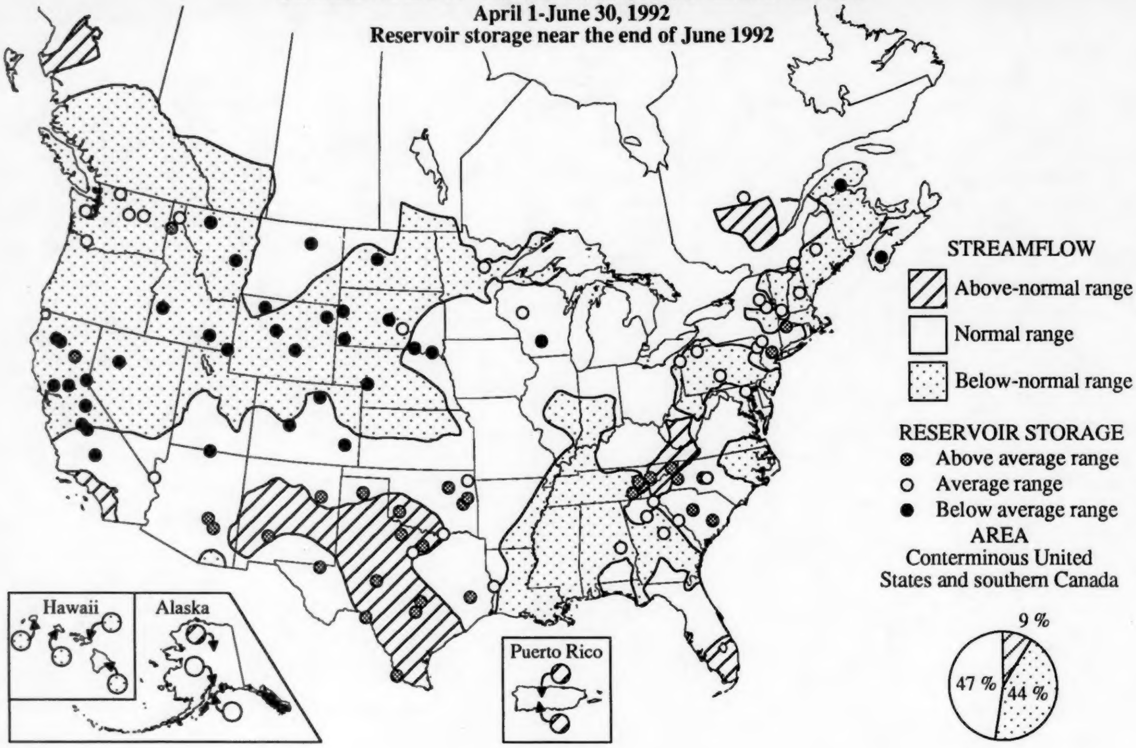
MONTHLY DEPARTURE OF ACTUAL STREAMFLOW (OCTOBER 1986-JUNE 1992) FROM MEDIAN STREAMFLOW (1951-80)



STREAMFLOW CONDITIONS FOR SPRING 1992

April 1-June 30, 1992

Reservoir storage near the end of June 1992

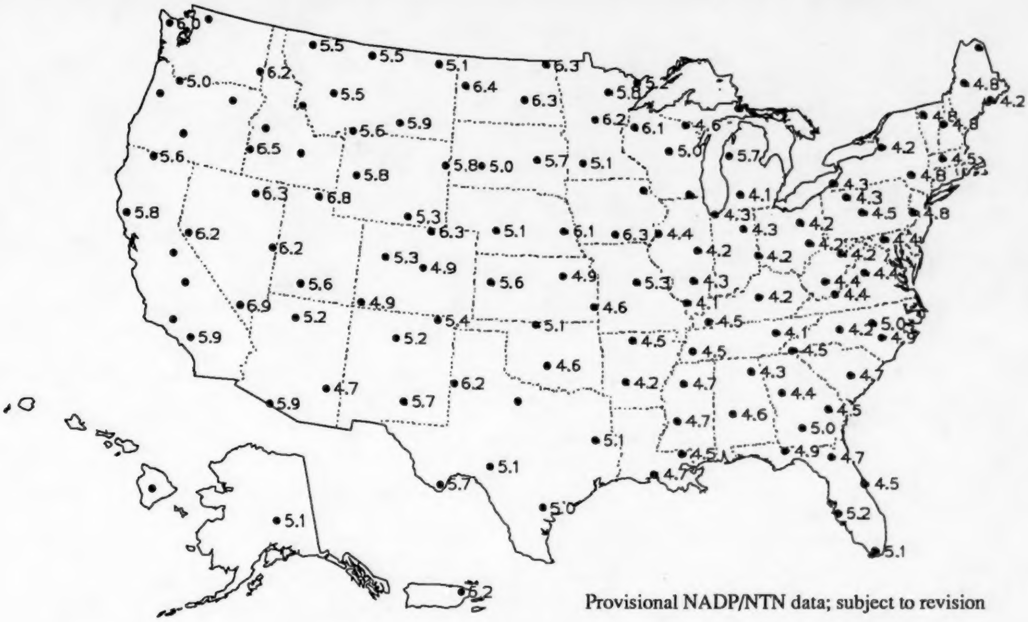


STREAMFLOW CONDITIONS FOR SPRING 1991

April 1-June 30, 1991

Reservoir storage near the end of June 1991

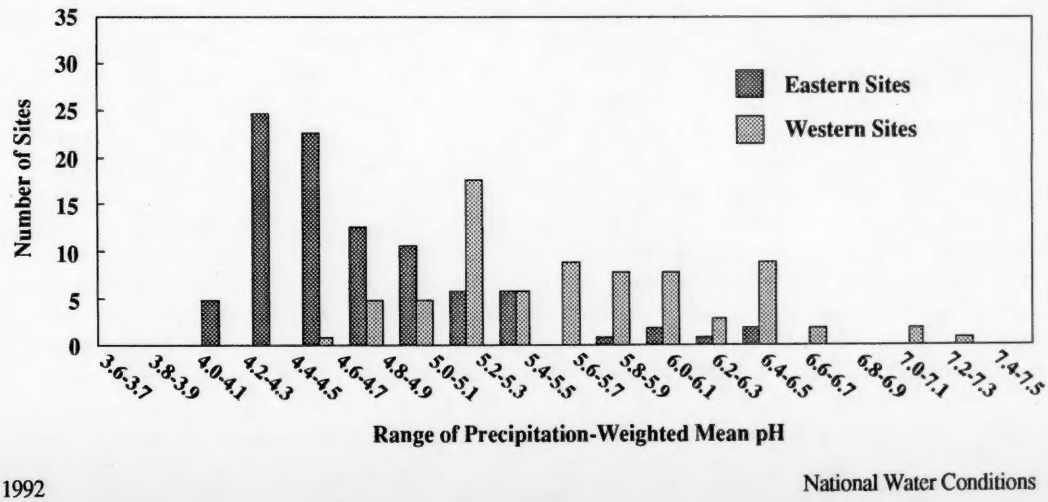
pH of Precipitation for May 25-June 21, 1992



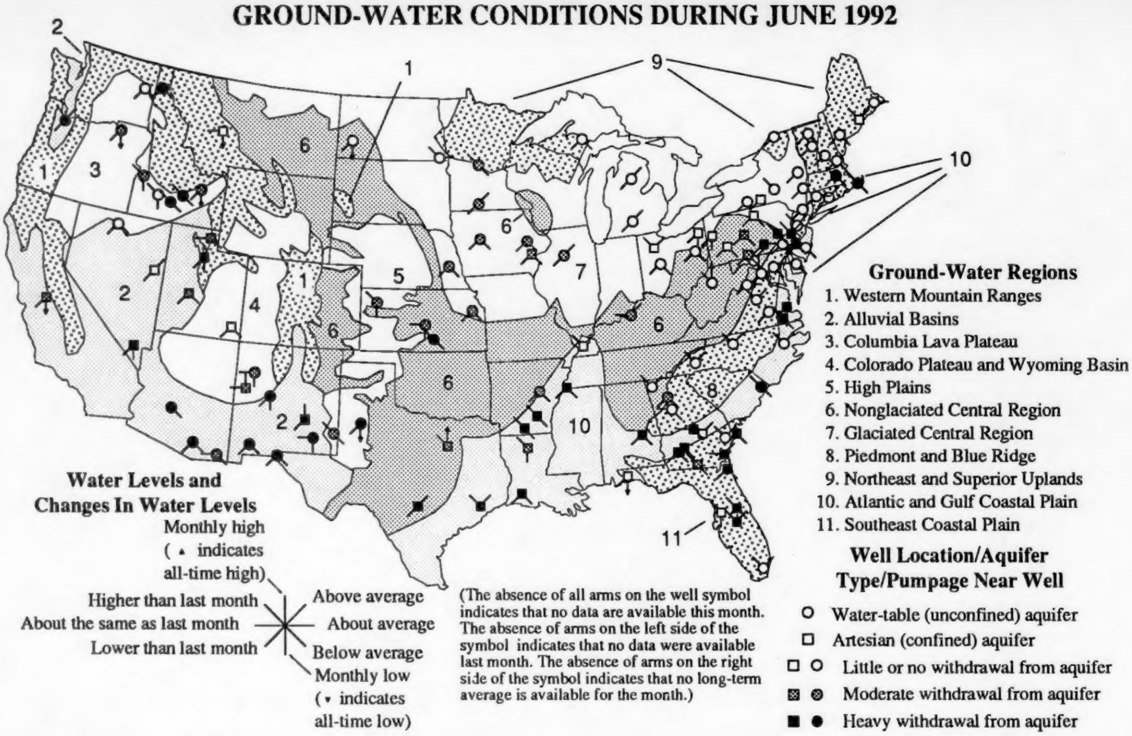
Current pH data shown on the map (• 4.9) are precipitation-weighted means calculated from preliminary laboratory results provided by the NADP/NTN Central Analytical Laboratory at the Illinois State Water Survey and are subject to change. The 128 points (•) shown on this map represent a subset of all sites chosen to provide relatively even geographic spacing. Absence of a pH value at a site indicates either that there was no precipitation or that data for the site did not meet preliminary screening criteria for this provisional report.

A list of the approximately 200 sites comprising the total Network and additional data for the sites are available from the NADP/NTN Coordination Office, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523.

Distribution of precipitation-weighted mean pH for all NADP/NTN sites having one or more weekly samples for May 25-June 21, 1992. The East/West dividing line is at the western borders of Minnesota, Iowa, Missouri, Arkansas, and Louisiana.



GROUND-WATER CONDITIONS DURING JUNE 1992



New extremes occurred at 25 index wells (see table on page 22) during June-21 lows (including 8 all-time) and 4 highs (including 2 all-time)-compared with 32 new extremes last month. Graphs showing water levels at seven stations—for wells in the Alluvial Basins region in Utah, Columbia Lava Plateau region in Oregon, the Nonglaciated Central region in Texas, the Piedmont and Blue Ridge region in North Carolina, the Northeast and Superior Uplands region in Michigan, and the Atlantic and Gulf Coastal Plain region in Tennessee and New Jersey for the past 26 months are on page 23.

Ground-water levels in the Western Mountain Ranges region were at or below last month's levels and below long-term average throughout the Region. An all-time low occurred in the Cretaceous aquifer well near Helena, Montana.

In the Alluvial Basins region, levels were at or below last month's levels throughout the Region. Levels were below long-term average in California, Utah, Arizona, and Texas; above average in Oregon; and mixed elsewhere. June lows occurred in wells in California, Nevada, Utah (see first graph on page 23), and New Mexico. An all-time low occurred in the Mehrten aquifer in Wilton, California. A June high occurred in one well in New Mexico.

In the Columbia Lava Plateau region, water levels were below last month's in Oregon and mixed with respect to last month's in Idaho. Levels were below long-term averages throughout the Region. June lows occurred in wells in Idaho and Oregon. All-time lows occurred in the Snake River Plain aquifer well near Atomic City, Idaho, and in the Columbia River basalts aquifer at Pendleton, Oregon (see second graph on page 23).

Ground-water levels were at or below last month's levels throughout the Colorado Plateau and Wyoming Basin region. Levels were below long-term average in Utah and mixed with respect to average in New Mexico. A June low occurred in one well and a June high occurred in one well in New Mexico.

In the High Plains region, water levels were below last month's levels in Texas and above last month's levels in Kansas and New Mexico. Levels were below long-term average throughout the Region. A June low occurred in the well in Kansas and an all-time low level occurred in the Ogallala aquifer well near Lubbock, Texas.

Water levels in the Nonglaciated Central region were generally below last month's levels in North Dakota and most of Pennsylvania and at or above last month's levels elsewhere. Water levels were above long-term averages in Texas, Kentucky, Maryland, West Virginia, and Georgia; and at or below average elsewhere. A June low occurred in a well in Kansas and an all-time low occurred in Sentinel Butte aquifer near Dickinson, North Dakota. All-time highs occurred in the Twin Mountains (Trinity) aquifer near

Provisional data; subject to revision

WATER LEVELS IN KEY OBSERVATION WELLS IN SOME REPRESENTATIVE AQUIFERS IN THE CONTERMINOUS UNITED STATES–JUNE 1992

GROUND–WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well in feet	Water level in feet below land–surface datum	Departure from average in feet	Net change in water level in feet since: Last month	Last year	Year records began	Remarks
WESTERN MOUNTAIN RANGES (1)								
Rathdrum Prairie aquifer near Athol, northern Idaho	●	485	463.3	–3.5	–0.4	–4.8	1929	
ALLUVIAL BASINS (2)								
Alluvial valley fill aquifer in Steptoe Valley, Nevada	□	122	8.89	3.13	–.60	–1.04	1949	
Valley fill aquifer, Elfrida area near Douglas, Arizona	◍	124	101.15	–16.56	–.05	.97	1947	
Hueco bolson aquifer at El Paso, Texas	●	640	271.71	–16.31	–.21	2.44	1964	
COLUMBIA LAVA PLATEAU (3)								
Snake River Plain aquifer near Eden, Idaho	●	208	125.2	–1.2	3.1	1.9	1962	
Columbia River basalts aquifer, Pendleton, Oregon		1,501	228.22	–40.49	–2.53	–9.27	1965	All–time low
COLORADO PLATEAU AND WYOMING BASIN (4)								
Dakota aquifer near Blanding, Utah	□	140	50.16	–4.12	–.40	–1.41	1960	
HIGH PLAINS (5)								
Ogallala aquifer near Colby, Kansas	◍	175	131.43	–12.26	.22	–1.25	1947	June low
Southern High Plains aquifer, Lovington, New Mexico	◍	212	58.83	–4.17	.15	1.42	1971	
NONGLACIATED CENTRAL REGION (6)								
Sentinel Butte aquifer near Dickinson, North Dakota	○	160	22.03	–4.73	–.21	–.71	1968	All–time low
Sand and gravel Pleistocene aquifer near Valley Center, Kansas	●	54	19.76	–2.74	1.26	.62	1937	
Glacial outwash sand and gravel aquifer near Louisville, Kentucky	◍	94	18.40	5.60	–.04	–1.83	1945	
Upper Pennsylvanian aquifer in the Central Appalachians Plateau near Glenville, West Virginia	○	25	11.55	5.29	.36	2.75	1953	All–time high
GLACIATED CENTRAL REGION (7)								
Fluvial sand and gravel aquifer, Platte River Valley, near Ashland, Nebraska	●	12	6.12	–1.63	–.45	–2.97	1933	
Sheyenne Delta aquifer near Wyndmere, North Dakota	○	40	3.98	.09	3.18	2.87	1963	
Pleistocene (glacial drift) aquifer at Princeton in northern Illinois	◍	29	6.90	2.24	–.62	–.08	1942	
Shallow drift aquifer near Roscommon in north–central part of Lower Peninsula, Michigan	○	14	3.85	.37	–.42	.04	1934	
Silurian–Devonian carbonate aquifer near Dola, Ohio	□	51	6.38	.44	.27	.42	1954	
PIEDMONT AND BLUE RIDGE (8)								
Water–table aquifer in Petersburg Granite, southeastern Piedmont, Colonial Heights, Virginia	○	100	15.40	0	–.44	.61	1939	
Weathered granite aquifer, western Piedmont, Mocksville area, North Carolina	○	31	15.48	2.17	.16	–.92	1981	
Surficial aquifer at Griffin, Georgia	○	30	16.45	–1.67	.02	–1.89	1943	
NORTHEAST AND SUPERIOR UPLANDS (9)								
Pleistocene glacial outwash aquifer, at Camp Ripley, near Little Falls, Minnesota	◍	59	15.31	–1.50	.12	–.79	1949	
Glacial outwash sand aquifer at Oxford, Maine	○	39	8.24	–.29	–.36	–.07	1980	
Shallow sand aquifer (glacial deposits), Acton, Massachusetts	●	34	18.87	–.71	–.39	.07	1965	
Pleistocene sand aquifer near Morrisville, Vermont	○	50	19.72	–.99	–.93	–.64	1966	
ATLANTIC AND GULF COASTAL PLAIN (10)								
Columbia deposits aquifer near Camden, Delaware	○	11	7.65	–1.66	.02	–.21	1950	
Memphis sand aquifer near Memphis, Tennessee	■	384	107.58	–17.38	–.44	–1.54	1940	
Eutaw aquifer in the City of Montgomery, Alabama	■	270	26.4	–3.8	–3.0	–3.7	1952	
Evangeline aquifer at Houston, Texas	■	1,152	282.52	16.46	1.43	19.27	1978	
SOUTHEAST COASTAL PLAIN (11)								
Upper Floridan aquifer on Cockspur Island, Savannah area, Georgia	■	348	34.22	–5.62	–.71	–.19	1956	
Upper Floridan aquifer, Jacksonville, Florida	■	905	–21.4	–5.4	–.2	–1.0	1930	
Biscayne aquifer near Homestead, Florida	○	20	5.77	1.02	2.51	.07	1932	

Hurst/Fort Worth, Texas, and in the Upper Pennsylvanian aquifer near Glenville, West Virginia. Water levels in the Edwards aquifer at San Antonio, Texas, are shown in the third graph on page 23.

Ground-water levels in the Glaciated Central region were above last month's in North Dakota; mixed in Ohio and New York; and below last months levels elsewhere. Levels were at or above long-term averages in North Dakota, Minnesota, Illinois, and Michigan; mixed in Ohio; and below average elsewhere in the Region. June lows occurred in wells in South Dakota, Ohio, and Pennsylvania.

In the Piedmont and Blue Ridge region, ground-water levels were above last month's in North Carolina and New Jersey; mixed in Pennsylvania and Virginia; and below last month's in Maryland and Georgia. Water levels were at or below long-term averages in Maryland and Georgia; above

Provisional data; subject to revision

NEW EXTREMES DURING JUNE AT GROUND-WATER INDEX STATIONS

WRD Station Identification Number	GROUND-WATER REGION Aquifer and Location	Aquifer type and local aquifer pumpage	Depth of well	Years of record	End-of-month water level in feet below land surface datum: Previous June Record: Average	Extreme (year)	June 1992
	LOW WATER LEVELS						
	WESTERN MOUNTAIN RANGES						
463906112043901	Cretaceous aquifer near Helena, Montana	□	110	16	29.41	36.75 (1988)	[1]38.41
	ALLUVIAL BASINS						
324340104231701	Roswell Basin shallow aquifer at Dayton, New Mexico	●	250	41	92.61	122.96 (1991)	123.08
351051106395301	Basin-fill aquifer at Albuquerque, New Mexico	●	980	10	34.90	37.69 (1991)	38.41
361611115151301	Valley-fill aquifer near Las Vegas, Nevada	■	905	47	36.70	103.33 (1991)	104.14
382444121123301	Mehrten aquifer near Wilton, California	▩	300	6	135.30	138.33 (1991)	[1]141.50
403803111505301	Basin-fill aquifer near Holladay, Utah	■	165	14	71.83	87.04 (1991)	90.16
	COLUMBIA LAVA PLATEAU						
425635114382302	Snake River Plain aquifer at Gooding, Idaho	○	165	21	136.1	148.2 (1991)	150.0
432700112470801	Snake River Plain aquifer near Atomic City, Idaho	◍	636	43	585.1	587.8 (1981)	[1]589.1
433852116244801	Shallow alluvium aquifer near Meridian, Idaho	◍	32	51	5.5	8.4 (1953)	8.5
453934118491701	Columbia River basalts aquifer at Pendleton, Oregon	◍	1,501	26	187.73	218.95 (1991)	[1]228.22
	COLORADO PLATEAU AND WYOMING BASIN						
352023107473201	Westwater Canyon aquifer near Grants-Bluewater, New Mexico	◍	155	37	72.88	78.65 (1991)	79.79
	HIGH PLAINS						
341010102240801	Ogallala aquifer near Lubbock, Texas	●	202	42	58.72	91.97 (1991)	[1]94.00
392329101040201	Ogallala aquifer near Colby, Kansas	◍	175	46	119.17	130.18 (1991)	131.43
	NONGLACIATED CENTRAL REGION						
375810097324301	Equus aquifer near Halstead, Kansas	◍	57	53	23.40	38.70 (1991)	39.93
410538080280801	Sandstone and shale aquifer at Pulaski State Game Land 150 near Pulaski, Pennsylvania	□	150	25	16.61	18.09 (1988)	18.33
465755102410701	Sentinel Butte aquifer near Dickinson, North Dakota	○	160	24	17.30	21.32 (1991)	[1]22.03
	GLACIATED CENTRAL REGION						
411401081025000	Pennsylvanian sandstone aquifer near Windham, Ohio	□	55	47	18.88	21.39 (1988)	22.62
	ATLANTIC AND GULF COASTAL PLAIN						
303108087162301	Sand and gravel aquifer at Ensley, Florida	□	239	53	74.33	82.64 (1975)	[1]83.67
322357092341701	Sparta aquifer near Ruston, Louisiana	◍	703	19	223.58	236.70 (1991)	237.49
372506076511703	Upper Potomac aquifer near Toano, Virginia	■	401	8	158.60	161.37 (1990)	[1]163.90
	SOUTHEAST COASTAL PLAIN						
281715082164401	Upper Floridan aquifer near San Antonio, Florida	□	150	29	41.57	48.32 (1991)	50.47
	HIGH WATER LEVELS						
	COLORADO PLATEAU AND WYOMING BASIN						
351651107594501	San Andres-Yeso aquifer at Bluewater, New Mexico	▩	505	47	110.33	99.94 (1946)	99.34
	ALLUVIAL BASINS						
332615104303601	Roswell Basin artesian aquifer at Roswell, New Mexico	■	324	26	61.88	47.60 (1991)	38.70
	NONGLACIATED CENTRAL REGION						
324842097102901	Twin Mountains (Trinity) aquifer near Hurst/Fort Worth, Texas	◍	667	15	458.11	441.20 (1991)	[2]438.03
385604080495901	Upper Pennsylvanian aquifer near Glenville, West Virginia	○	25	39	16.84	12.95 (1990)	[2]11.55

[1] All-time month-end low.

[2] All-time month-end high.

long-term averages in North Carolina and New Jersey; and mixed in Pennsylvania and Virginia. Water levels in the Weathered gneiss saprolite aquifer at Blantyre, North Carolina, are shown in the fourth graph on page 23.

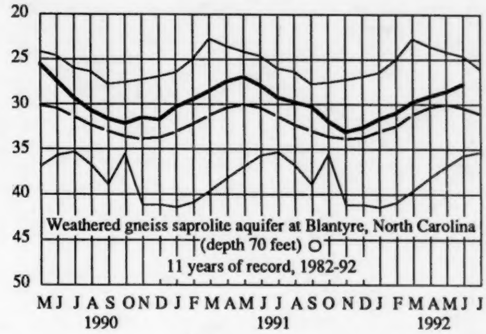
In the Northeast and Superior Uplands region, ground-water levels were above last month's levels in Minnesota and below last month's levels elsewhere in the Region. Water levels were below average throughout the Region except in Connecticut where levels were mixed. Water levels in the Glacial drift aquifer near Ishpeming Michigan, are shown in the fifth graph on page 23.

In the Atlantic and Gulf Coastal Plain region, ground-water levels were at or above last month's in Massachusetts, Delaware, North and South Carolina, Kentucky, and Texas; mixed in New Jersey, Virginia, Georgia, Arkansas, and Louisiana; and below last month's levels in Alabama, Florida, and Tennessee. Ground-water levels were above long-term averages in Kentucky, and Texas; mixed in Georgia; and below average elsewhere. A June low occurred in a well in Arkansas. All-time lows occurred in wells in the Upper Potomac aquifer near Toano, Virginia, and in the sand and gravel aquifer at Ensley, Florida. Water levels in the Memphis sand aquifer near Memphis, Tennessee, and the Kirkwood-Cohansey aquifer at Lebanon State Forest near Woodland, New Jersey, are shown in the sixth and seventh graphs, respectively, on page 23.

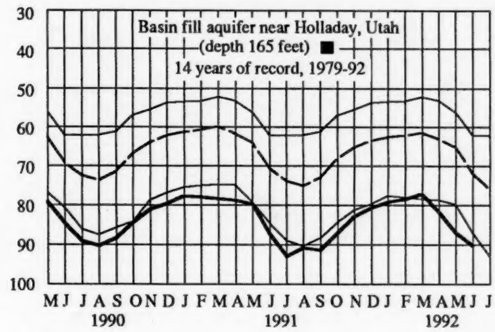
In the Southeast Coastal Plain region, water levels were generally above last month's levels in Florida and mixed with respect to last month's in Georgia. Levels were mixed with respect to long-term average throughout the Region. A June low water level occurred in one well in Florida.

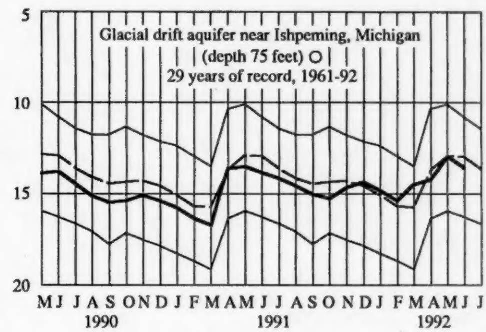
MONTHEND GROUND-WATER LEVELS IN SELECTED WELLS

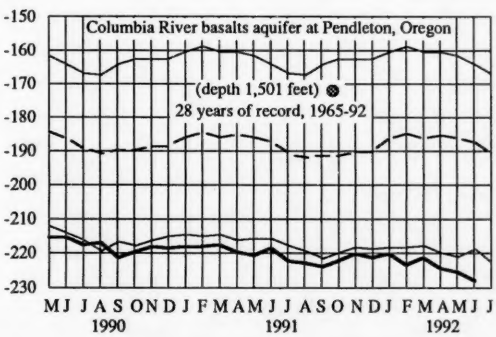
Area between light-weight solid lines indicates range between highest and lowest record for the month. Dashed line indicates average of monthly levels in previous years. Heavy line indicates level for current period.

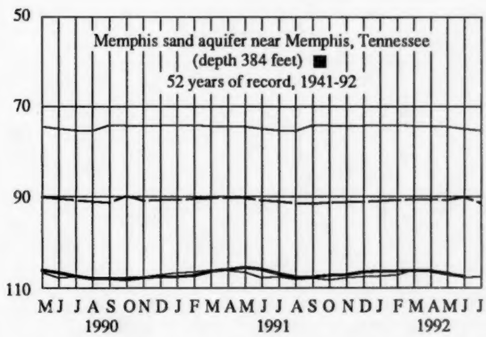


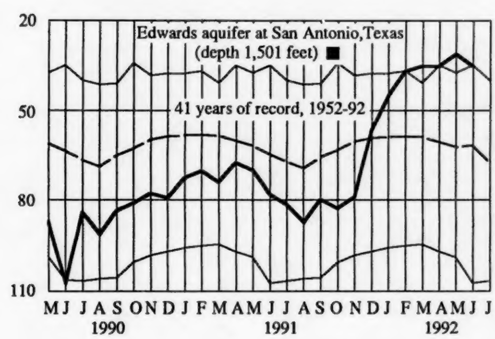
WATER LEVEL, FEET BELOW LAND-SURFACE DATUM

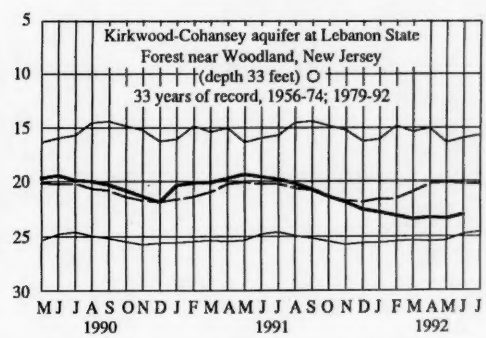


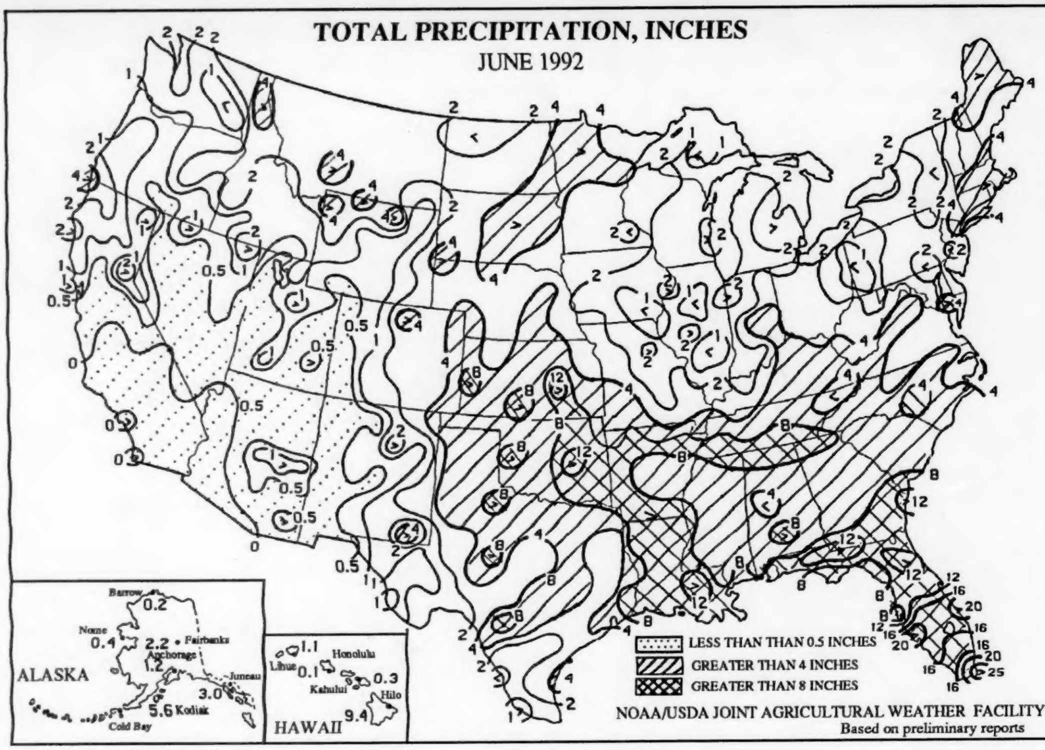


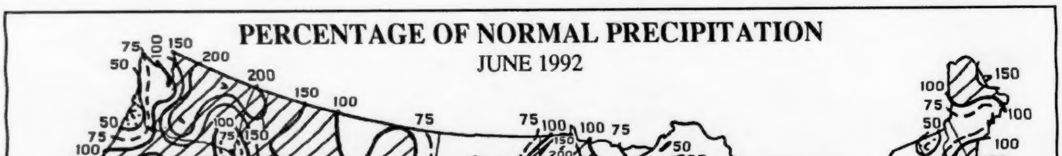










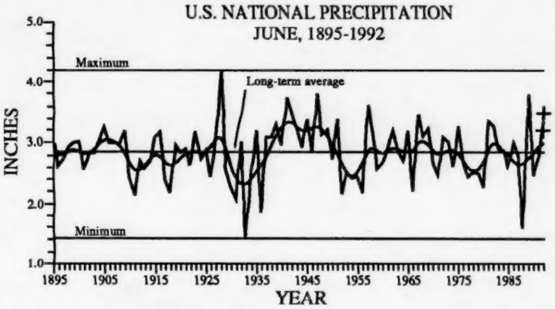


(From *Weekly Weather and Crop Bulletin*, NOAA/USDA Joint Agricultural Weather Facility)

UNITED STATES JUNE CLIMATE IN HISTORICAL PERSPECTIVE

Preliminary data indicate that temperature averaged across the contiguous United States was below the long-term mean, ranking June 1992 as the 23rd coolest June on record (the record begins in 1895). This is a departure from the unusual warmth that dominated most of the previous six Junes. About 23 percent of the country averaged much cooler than normal while about 9 percent averaged much warmer than normal for June 1992.

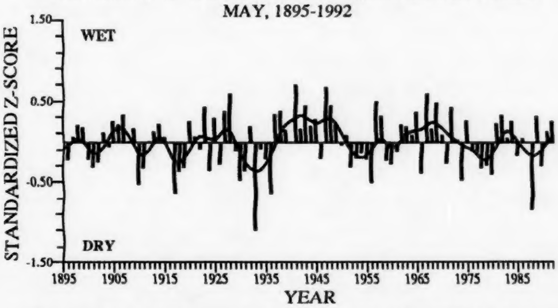
U.S. NATIONAL PRECIPITATION
JUNE, 1895-1992



Areally-averaged precipitation for the nation (see graph above) was above the long-term mean, ranking June 1992 as the 11th wettest (88th driest) June on record. The preliminary value for precipitation is estimated to be accurate to within 0.15 inch and the confidence interval is plotted in the graph above as a '+'. About 22 percent of the country experienced much wetter than normal conditions and about 11.percent was much drier than normal.

Historical precipitation is shown in a different way in the graph below. The June precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1951-80 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. Negative values are dry, positive are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal climate. The areally-weighted mean standardized national precipitation ranked 1992 as the 24th wettest June on record.

U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX
MAY, 1895-1992

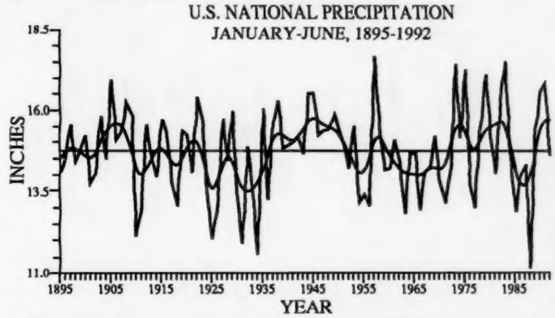


The temperature and precipitation rankings for June 1992 for the nine climatically homogeneous regions in the United States indicate that the overall precipitation pattern consisted of dry conditions (rankings in the lower third of the historical distribution) in the northeastern third of the country and wet conditions (rankings in the upper third of the distribution) along the southern and western edges of the country. Considerable variations in precipitation occurred, with the East North Central region having the seventh driest June on record while the Southeast and South regions each had the fourth wettest June on record. There was a pronounced west (hot) to east (cool) pattern in June temperatures, which was also characterized by extremes on each end of the scale. The Northwest region, dominated by an upper-level ridge in the atmospheric circulation, had the fourth hottest June on record. An upper-level trough dominated the mean circulation in the eastern U.S., giving the Central and South regions the ninth coolest June and the Southeast region the eleventh coolest June on record.

Eleven states (AL, DE, KS, KY, MD, NM, NC, OK, SC, TN, and VA) had the tenth coolest, or cooler, June on record. Three states (ID, OR, and WA) ranked in the top ten at the other end of the scale, with one (Washington) having the warmest June on record.

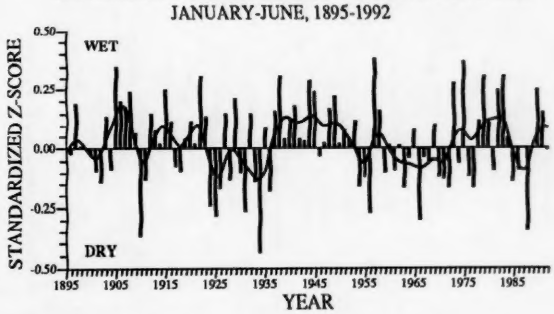
For the year thus far, the nation as a whole continued unusually warm, with January-June 1992 ranking as the fifth warmest such period on record. About 37 percent of the country had January-June average temperatures much warmer than normal while about 3 percent averaged much cooler than normal. This is a decrease in year-to-date warmth (and increase in year-to-date coolness) when compared to the January-May statistics, testifying to the magnitude and extent of the June cool temperatures. Two States, Montana and Washington, had the warmest January-June on record. Although none of the States ranked in the top ten coolest category, four States (AL, FL, GA, and SC) had rankings in the cool third of the historical distribution.

U.S. NATIONAL PRECIPITATION
JANUARY-JUNE, 1895-1992

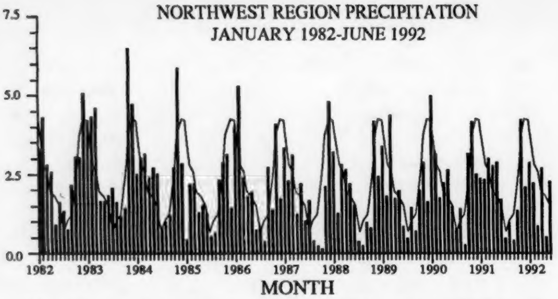


Precipitation averaged across the contiguous U.S., for the year thus far, ranks 1992 in the middle of the historical distribution at 44th driest (55th wettest). (See graph above.) When the local normal climate is taken into account, the year to date ranks as the 41st driest such period on record. (See graph below.) About 13 percent of the nation averaged much wetter than normal while about 20 percent averaged much drier than normal. January-June precipitation rankings for the 48 contiguous states show that eight States (ID, IL, IN, MI, MO, NJ, OH, and WI) had rankings in the top ten driest category, with Illinois ranking as the second driest. Three States (AZ, NM, and TX) ranked in the top ten wettest, with Texas having the wettest January-June on record.

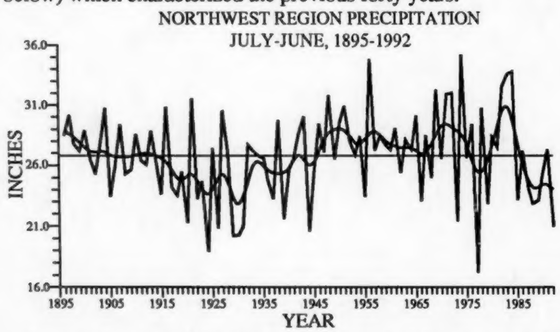
U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX
JANUARY-JUNE, 1895-1992



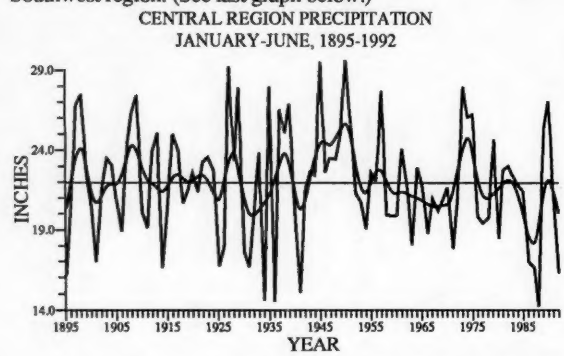
(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

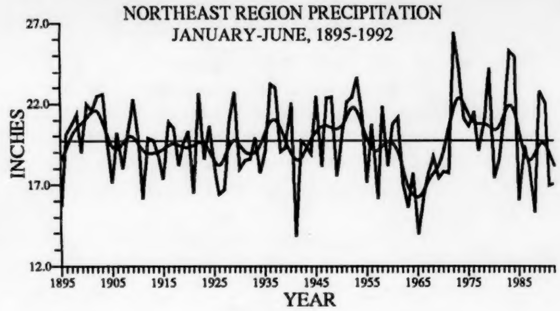


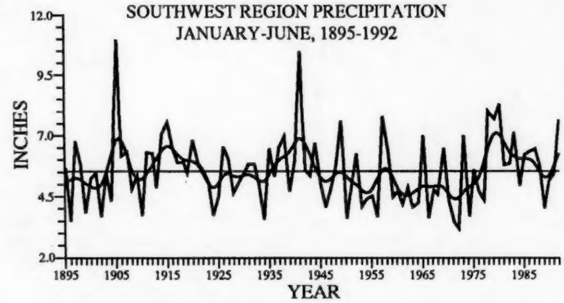
Monthly precipitation for January 1982 - June 1992 for the Northwest Region is shown above. Only three of the last twelve months have had above-normal precipitation, indicated by the bars above the normal line in the figure. Much of the rainy season had below-normal precipitation, resulting in the seventh driest July-June period on record for this region as shown on the graph below. The last eight July-June periods have been near to drier than the long-term mean, which is a departure from the predominantly wet conditions (indicated by the filtered curve in the graph below) which characterized the previous forty years.



January-June precipitation for the Central region is shown in the first graph below. January-June 1992 ranked as the sixth driest such period on record for this region, marking a return to the unusual dryness that characterized the mid to late 1980's. January-June 1992 ranked as the fourteenth driest such period for the Northeast region (secondt graph below), marking the second consecutive year with below normal precipitation of a magnitude comparable to the dryness of the mid-1960's. At the other extreme, 1992 had the seventh wettest January-June for the Southwest region. (See last graph below.)







January-June 1992 ranked as the 35th coolest such period for the Southeast region. This marks a return to the cool temperatures which dominated the late 1950's to mid-1980's.

There was little change in national long-term drought conditions in June compared to May. The percent area of the contiguous U.S. experiencing severe to extreme long-term drought (as defined by the Palmer Drought Index) hovered at about 19 percent. The percent area experiencing long-term wet conditions has paralleled the drought trend for the last three months. The core drought areas appear to be focused in the Pacific Northwest and Ohio Valley, while the core wet areas were located in the southwestern states and river basins.

According to preliminary data from the National Weather Service, there were 421 tornadoes across the United States in June 1992, which is a record for June and compares to the 1953-1991 average of 156. The year-to-date total of 722 is above the long-term average of 522. It should be noted that the preliminary tornado count is generally higher than the final count. For example, the preliminary annual counts for 1990 and 1991 were about 20 percent higher than the final annual counts for those two years.

(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

Climate Regions Used by National Climatic Data Center

1. Northeast
2. East North Central
3. Central
4. Southeasr
5. West North Central
6. South
7. Southwest
8. Northwest
9. West

(From *Climate Variations Bulletin*, National Climatic Data Center, NOAA)

JUNE WEATHER SUMMARY

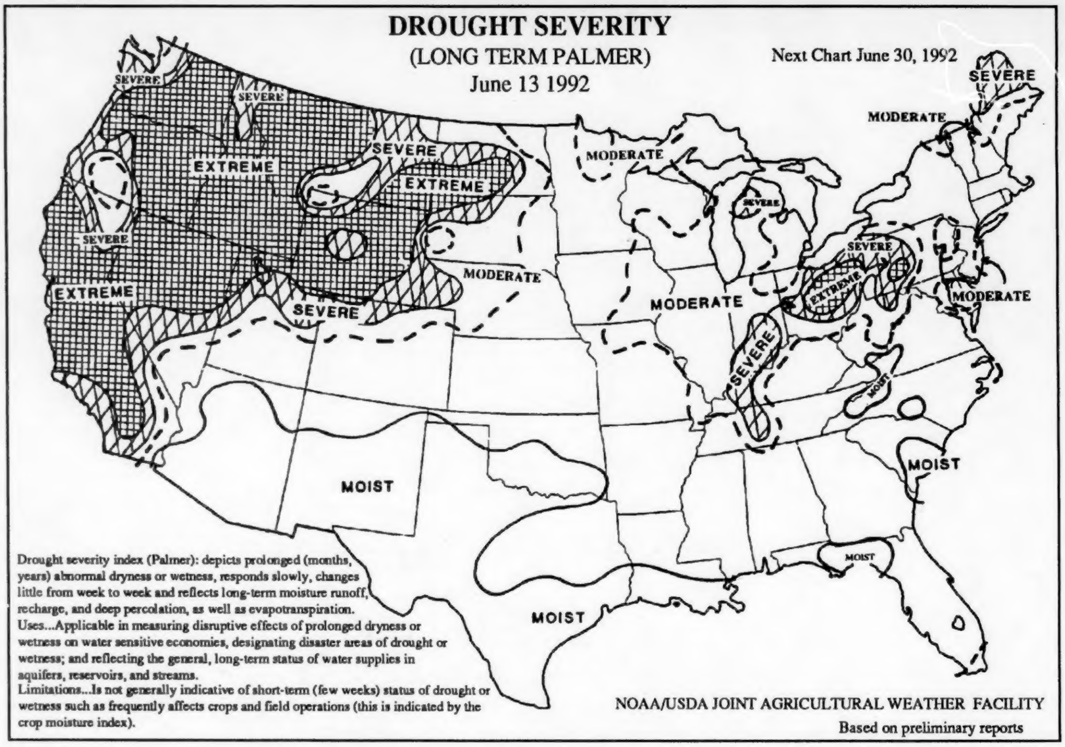
June 1992 showed two faces. During the first half of the month, storms crept across the southern Plains and into the Southeast. The two-week spate of rainfall pushed monthly rainfall to more than twice normal from New Mexico to Alabama, and held temperatures to May-like levels. During a mid-month transitional period, a powerful storm brought needed moisture to the Northwest and northern Plains. For the second half of the month, cool, mainly dry weather covered the East, allowing drought to retain its grip on the Corn Belt. Meanwhile, oppressive heat developed in the Southern and Western States. Late in the month, a tropical depression brought copious rainfall to west central Florida.

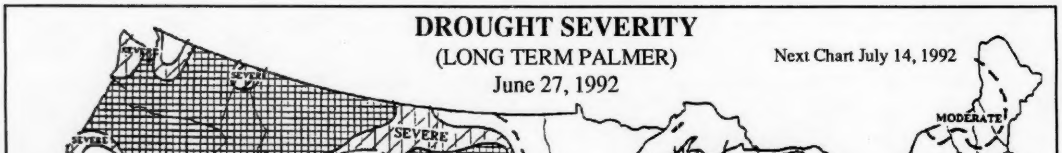
The early-month rainfall brought mixed returns. In the southern Plains, excessive moisture delayed the winter wheat harvest and adversely affected young cotton plants. But in the Southeast, rains eased concerns of incipient drought. One early-month storm turned northeastward and caused flooding from the Middle Atlantic region to New England between June 4 and 6. Up to 8 inches of rain soaked the central Appalachian foothills, and similar amounts pounded Connecticut.

A few cold airmasses skirted the Northern Tier States during the first half of the month, bringing scattered frost. Havre, MT, reached 29 °F on the 6th, and Bismarck, ND, dipped to 33 °F on the 7th. But the mid-month storm generated the coldest weather of the month, piling 1 foot of snow on Yellowstone National Park and sending the mercury to 22 °F in Ely, NV. The storm also brought the first significant rainfall in 6 weeks to the Northwest, and eased drought in the northern Plains and the Corn Belt. But the accompanying outbreak of more than 150 tornadoes was nature's most prodigious 3-day output since 1984, according to press reports. Despite the rain on the 17th in the northern Corn Belt, dry, cool weather predominated during June. Eastern Iowa, northern Illinois, and northeastern Missouri remained critically dry through the end of June, having received less than 2 inches of rain since May 1.

The second half of the month was marked by a sharp northeast-to-southwest temperature contrast and scattered thunderstorms in the Southern States. Very cool weather blanketed the Northeast, with temperatures dropping to 32 °F in Muskegon and Marquette, MI, on the 22nd. More than 120 daily record lows were set during the cold snap, including 67 °F on the 22nd. A concurrent heat wave in the West set numerous records, including an all-time June record of 101 °F in Seattle, WA. The collision of contrasting airmasses produced scattered daily thunderstorms from the Plains into the Southeast. In the eastern Gulf of Mexico, a cluster of thunderstorms developed into a tropical depression on the 25th and lasted 1 day before making landfall in west-central Florida. Up to 26 inches of rain deluged areas north of Ft. Myers, FL, and record flooding occurred on the Myakka River. At month's end, a significant storm punched into the Northwest and northern Plains, following a track similar to that of the mid-month storm.

(From W*eekly Weather and Crop Bulletin*, NOAA/USDA Joint Agricultural Weather Facility)





(From *Weekly Weather and Crop Bulletin*, NOAA/USDA Joint Agricultural Weather Facility)

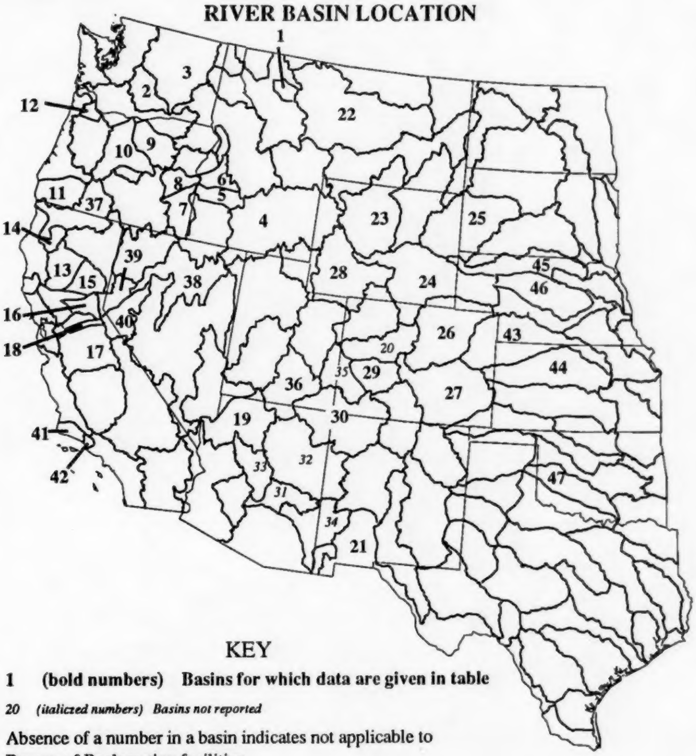
BUREAU OF RECLAMATION RESERVOIR STORAGE IN SELECTED RIVER BASINS
JUNE 30, 1992

River basin number	Basin	Storage, in 1,000 acre-feet	Percent of average	River basin number	Basin	Storage, in 1,000 acre-feet	Percent of average
1	South Fork Flathead	2,182	77	23	Bighorn	2,165	95
2	Yakima	731	73	24	North Platte	1,326	63
3	Columbia	5,603	100	25	Cheyenne	258	63
4	Upper Snake	1,959	54	26	South Platte[2]	719	95
5	Boise	237	24	27	Arkansas[3]	474	118
6	Payette	595	77	28	Upper Green[4]	3,244	[1]87
7	Owyhee	39	6	29	Gunnison[5]	699	[1]84
8	Malheur	1	1	30	San Juan[6]	1,586	[1]94
9	Umatilla	45	51	36	Upper Colorado[7]	15,276	[1]63
10	Deschutes	186	45	37	Klamath	287	37
11	Rogue	41	34	38	Humboldt	0	0
12	Tualatin	46	92	39	Truckee (excluding Lake Tahoe)	92	52
13	Sacramento	2,411	79				
14	Trinity	1,030	53	40	Carson	24	13
15	Feather	1,747	68	41	Santa Ynez	176	119
16	American	467	63	42	Ventura	199	96
17	San Joaquin	274	75	43	Republican	435	69
18	Stanislaus	232	17	44	Solomon	242	83
19	Lower Colorado	21,695	[1]77	45	Niobrara	93	103
21	Lower Rio Grande	2,563	98	46	Lower Platte	192	108
22	Upper Missouri	2,368	84	47	Washita	255	127

[1 acre-foot = 0.04356 million cubic feet = 0.326 million gallons = 0.504 cubic feet per second per day. The percent of average storage refers to the average storage on that date over a historic period of record which varies by reservoir.]

[1]Percent of storage capacity rather than percent of average.
[2]Includes Colorado River storage water for the Colorado Big-Thompson Project.
[3]Includes Fryingpan-Arkansas Project storage water.
[4]Flaming Gorge Dam storage water.
[5]Blue Mesa Dam storage water.
[6]Navajo Reservoir storage water.
[7]Lake Powell storage only.

RIVER BASIN LOCATION



KEY

1 (bold numbers) Basins for which data are given in table

20 (italicized numbers) Basins not reported

Absence of a number in a basin indicates not applicable to Bureau of Reclamation facilities

(From *Water Supply Conditions for the Western States*, U.S. Bureau of Reclamation)

CALIFORNIA WATER CONDITIONS

(From California Water Supply Outlook, California Department of Water Resources)

This year statewide precipitation has averaged 85 percent. The distribution of this precipitation, however, has been disadvantageous in some respects because the State's main water supply areas were among those most slighted.

Runoff so far this year has averaged only 43 percent in the State, ranging from 37 percent in the North Lahontan Region to 113 percent in the South Coastal Region. Our most important water supply basins, the Sacramento and San Joaquin, averaged 46 percent and 42 percent respectively.

Statewide reservoir storage on July 1 was 17.8 million acre-feet (maf): 61 percent of average and 47 percent of capacity. Last year's storage was 19.1 maf, or 1.3 maf higher than this year. Storage again ranges widely from only 13 percent of average in the North Lahontan Region to 117 percent of average in the South Coastal Region. By this fall California's big water systems, the Central Valley Project and the State Water Project, will have only minimal reserves left for next year.

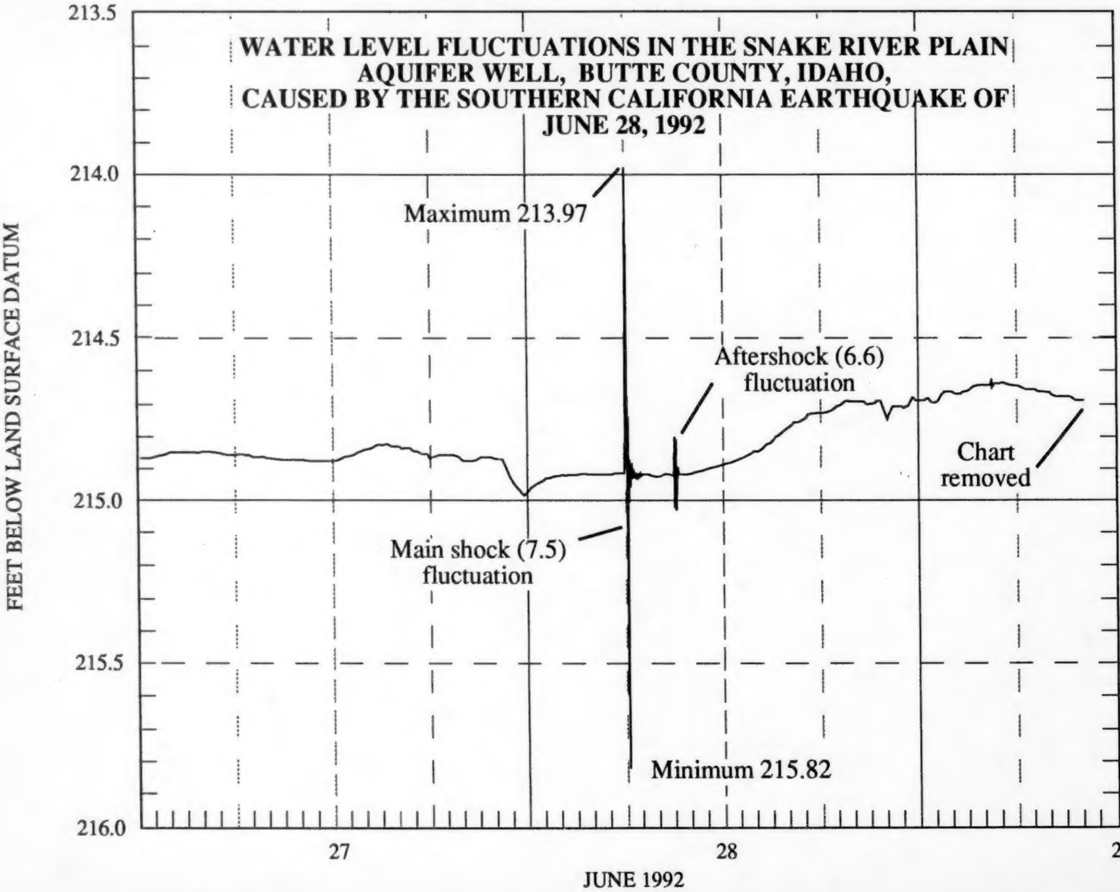
So what about next year? About 75 percent of average runoff overall would probably be enough to take care of most of next year's water needs. Remember, however, runoff was below 50 percent for 5 of the last 6 years and the wettest year 1989 was only about 70 percent. Historically, about 60 percent of the years provide 75+ percent or more runoff overall so the odds seem pretty good. Even so, the 75 percent threshold would not provide much storage recovery. In general, we would need about 110 percent of average runoff for recovery on most, but not all, reservoirs. About 30 percent of the years have been that wet. To a large extent, recovery of storage to average levels by next spring or early summer depends on the river's ratio of reservoir capacity to average runoff. There is little chance of recovery for reservoirs like New Melones and Berryessa whose watershed ratio exceeds two, while reservoirs whose watershed ratio is less than one, like Bullards Bar and Folsom, are more likely to fill to near average levels.

EFFECTS OF CALIFORNIA EARTHQUAKES ON GROUND-WATER LEVELS IN CALIFORNIA

A large number of aftershocks since the two June 28 earthquakes continue to occur in California and different effects on ground-water levels have been observed in two significantly different hydrogeological environments. In the Long Valley Caldera area near Mammoth Hot Springs in Mono County, three wells showed a water-level response to the earthquakes that ranged from a few hundredths of a foot to about 6 feet. In all cases, the water levels declined, which indicates aquifer dilation; the water level in the well that showed the 6-foot decline remained depressed for at least 30 minutes. In the Antelope Valley, water levels in a continually monitored piezometer showed a water-level **rise** of 0.6 foot. This increase persisted for over 24 hours before the water level in the piezometer started to decline.

CALIFORNIA EARTHQUAKES REFLECTED IN IDAHO GROUND-WATER LEVELS

The graph below is a reproduction of the chart from a recorder on a well in Idaho about 700 miles northeast of the epicenter of the June 28, 1992, southern California earthquake. The epicenter of the aftershock was offset slightly from that of the main shock and was almost an order of Richter magnitude less than that of the main shock. Thanks to Larry Mann of the Idaho Falls, Idaho, office.



TEMPERATURE OUTLOOK FOR JULY-SEPTEMBER 1992

PRECIPITATION OUTLOOK FOR JULY-SEPTEMBER 1992

OUTLOOK

Likely above median

About equal chances

Likely below median

From *Monthly and Seasonal Weather Outlook* prepared and published by the National Weather Service

NATIONAL WATER CONDITIONS

JUNE 1992

Based on reports from the Canadian and U.S. Field offices; completed August 24, 1992

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EXPLANATION OF DATA (Revised December 1990)

Cover map shows generalized pattern of streamflow for the month based on provisional data from 186 index gaging stations—18 in Canada, 166 in the United States, and 2 in the Commonwealth of Puerto Rico. Alaska, Hawaii, and Puerto Rico inset maps show streamflow only at the index gaging stations that are located near the point shown by the arrows. Classifications on map are based on comparison of streamflow for the current month at each index station with the flow for the same month in the 30-year reference period, 1951-80. Shorter reference periods are used for one Canadian index station, two Kansas index stations, and the Puerto Rico index stations because of the limited records available.

The ***streamflow ranges map*** shows where streamflow has persisted in the above- or below-normal range from last month to this month and also where streamflow is in the above- or below-normal range this month after being in a different range last month. Three ***pie charts*** show: the percent of stations reporting discharges in each flow range for both the conterminous United States and southern Canada, and also the percent of area in each flow range for the conterminous United States and southern Canada. The ***combination bar/line graph*** shows the percent departure of the total mean from the total median flow (1951-80) and the cumulative departure from median (in cfs) for all reporting stations (excluding eight large river stations indicated by # in the ***Flow of large rivers*** table) in the conterminous United States and southern Canada.

The comparative data are obtained by ranking the 30 flows for each month of the reference period in order of decreasing magnitude—the highest flow is given a ranking of 1 and the lowest flow is given a ranking of 30. Quartiles (25-percent points) are computed by averaging the 7th and 8th highest flows (upper quartile), 15th and 16th highest flows (middle quartile and median), and the 23rd and 24th highest flows (lower quartile). The upper and lower quartiles set off the highest and lowest 25 percent of flows, respectively, for the reference period. The median (middle quartile) is the middle value by definition. For the reference period, 50 percent of the flows are greater than the median, 50 percent are less than the median, 50 percent are between the upper and lower quartiles (in the normal range), 25 percent are greater than the upper quartile (above normal), and 25 percent are less than the lower quartile (below normal). Flow for the current month is then classified as: in the ***above-normal range*** if it is greater than the upper quartile, in the ***normal range*** if it is between the upper and lower quartiles, and in the ***below-normal range*** if it is less than the lower quartile. Change in flow from the previous month to the current month is classified as ***seasonal*** if the change is in the same direction as the change in the median. If the change is in the opposite direction of the change in the median, the change is classified as ***contraseasonal*** (opposite to the seasonal change). For example: at a particular index station, the January median is greater than the December median; if flow for the current January increased from December (the previous month), the increase is seasonal; if flow for the current January decreased from December, the decrease is contraseasonal.

Flood frequency analyses define the relation of flood peak magnitude to probability of occurrence or recurrence interval. ***Probability of occurrence*** is the chance that a given flood magnitude will be exceeded in any one year. ***Recurrence interval*** is the reciprocal of probability of occurrence and is the average number of years between occurrences. For example, a flood having a probability of occurrence of 0.01 (1 percent) has a recurrence interval of 100 years. ***Recurrence intervals imply no regularity of occurrence***; a 100-year flood might be exceeded in consecutive years or it might not be exceeded in a 100-year period.

Statements about ***ground-water levels*** refer to conditions near the end of the month. The water level in each observation well is compared with average level for the end of the month determined from the entire period of record for that well. ***Changes in ground-water levels***, unless described otherwise, are from the end of the previous month to the end of the current month.

Dissolved solids and temperature data are given for five stream-sampling sites that are part of the National Stream Quality Accounting Network (NASQAN). ***Dissolved solids*** are minerals dissolved in water and usually consist predominately of silica and ions of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, and nitrate. ***Dissolved-solids discharge*** represents the total daily amount of dissolved minerals carried by the stream. ***Dissolved-solids concentrations*** are generally higher during periods of low streamflow, but the highest dissolved-solids discharges occur during periods of high streamflow because the total quantities of water, and therefore total load of dissolved minerals, are so much greater than at times of low flow.

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